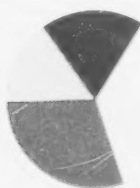


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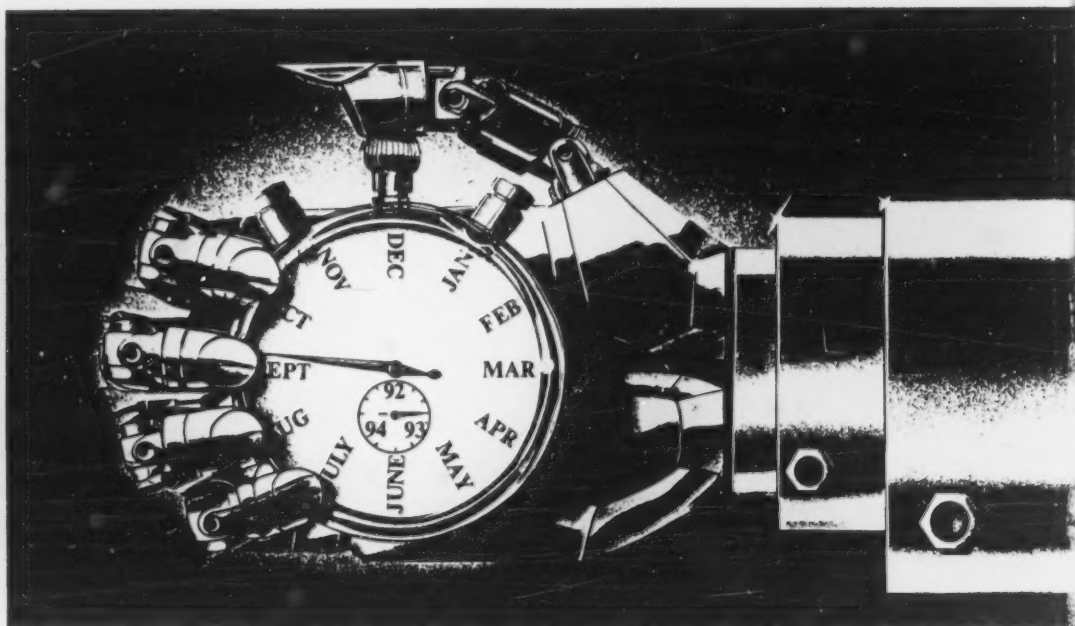
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The Economic Handbook of The Machine Tool Industry



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The Association For
Manufacturing Technology

Founded 1902 as National Machine Tool Builders' Association



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1992-1993 Economic Handbook of the Machine Tool Industry



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MESSAGE FROM THE PRESIDENT OF AMT



Once again, the importance of our industry is edging its way to the forefront of politics, education and public policy. Everyone agrees that the United States must "rebuild" our schools, our roads and our prosperity. But the lesson is just beginning to be "re-learned" that we cannot afford to rebuild anything without the wealth created by a strong manufacturing sector. There is no other way.

Our politicians seem to finally be recognizing that each and every job and the financing of every government program is built on the backbone of U.S. industry. As our industry suffered in the 1980s, as a result, so has the U.S. economy.

The lesson of the fundamental importance of manufacturing is not new. Japan and Germany rebuilt and prospered after World War II by focusing on manufacturing — a lesson learned from the United States, and one not forgotten. The European Community today is undertaking integration through its EC92 program to increase industrial competitiveness. And the economic strength of Asia, the fastest growing region in the world, is also the result of an emphasis on manufacturing.

Although long overdue, the movement back to our manufacturing roots seems unmistakable. To prepare, we must continue to take advantage of opportunities and create new ones. To do this, we must constantly work to ensure that we are informed; and use our resources in the most efficient way. It is our job at AMT to help on both counts.

The AMT Information Resource Center (IRC) is the hub of our information network, providing Association members access to marketing, technology and international information and trends. Databases on Conference Proceedings, Press Releases, and Trade and Industry News, provide immediate updates of potential opportunities. At the same time, ongoing AMT programs in quality, training, international trade and marketing statistics (including this Handbook) provide members the opportunity to systematically build their own resource base.

As our country begins to invest more in its manufacturing future, the responsibility is ours to rebuild U.S. industry, in the midst of formidable foreign competition. At AMT we understand this, and the vital importance in helping each member improve their competitive edge — our future generations depend on it.

Albert W. Moore
President

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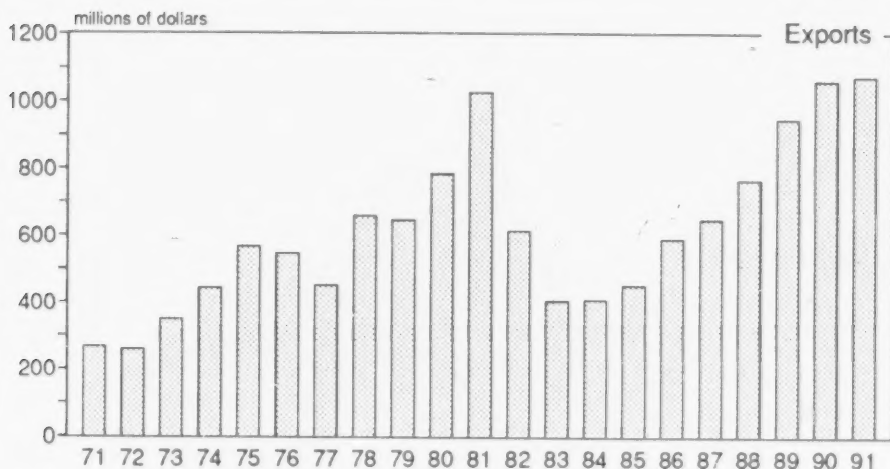
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GLOSSARY

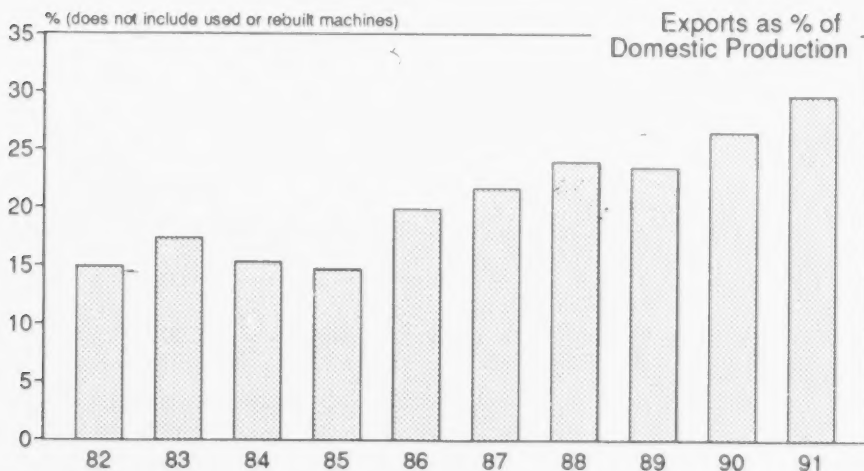
U.S. MACHINE TOOL INDUSTRY OVERVIEW

For the second straight year total U.S. machine tool exports reached a new high — \$1.076 billion during 1991. Exports have increased in each of the past eight years, and have doubled over the last five years.



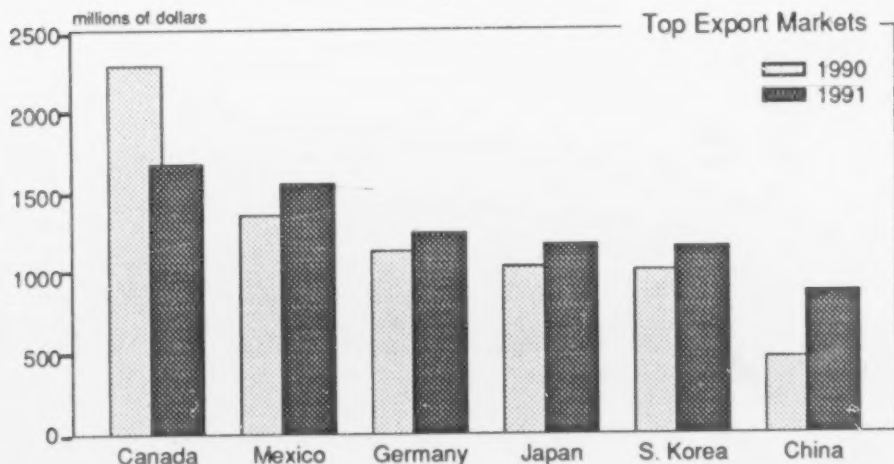
Source: U.S. Bureau of the Census

Exports account for nearly one-third of U.S. production, the highest level ever.



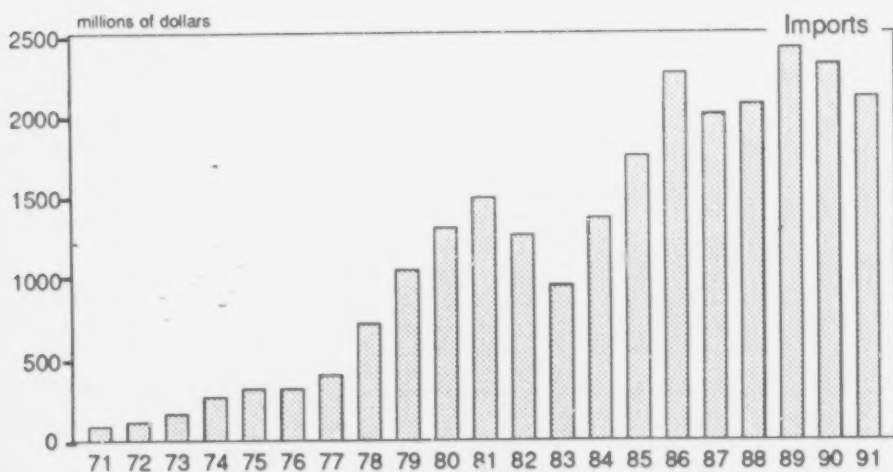
Source: U.S. Bureau of the Census

Canada, Mexico and Germany were again the top three markets, while the U.S. posted significant gains to Asia, particularly Japan, Korea and China.



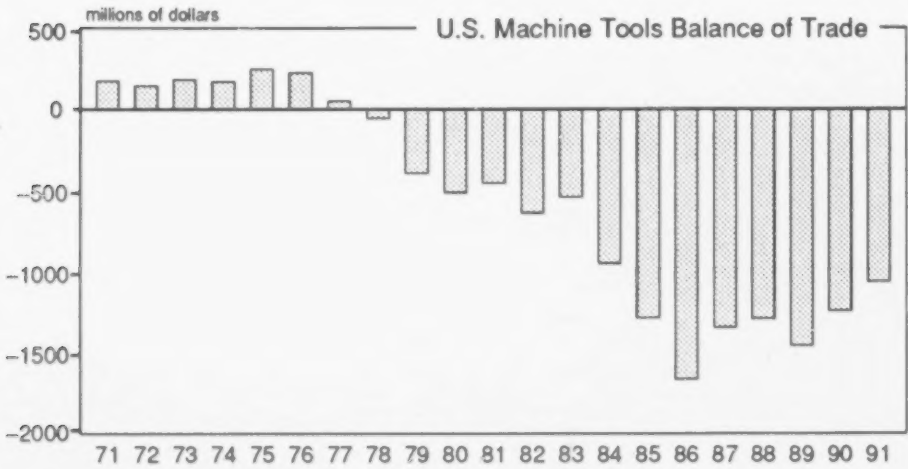
Source: U.S. Bureau of the Census

U.S. machine tool imports fell for the third straight year, after peaking in 1989. Imports were \$2.1 billion in 1991.



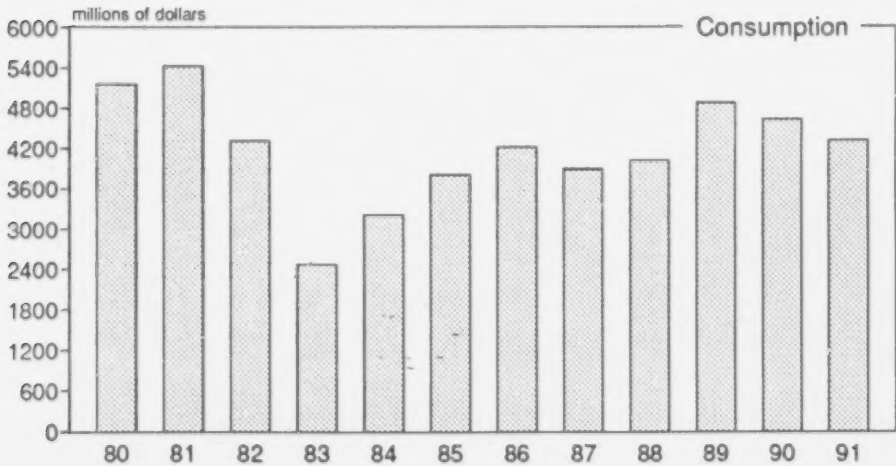
Source: U.S. Bureau of the Census

The drop in imports and gain in exports combined to improve the 1991 machine tool trade deficit by 15%.



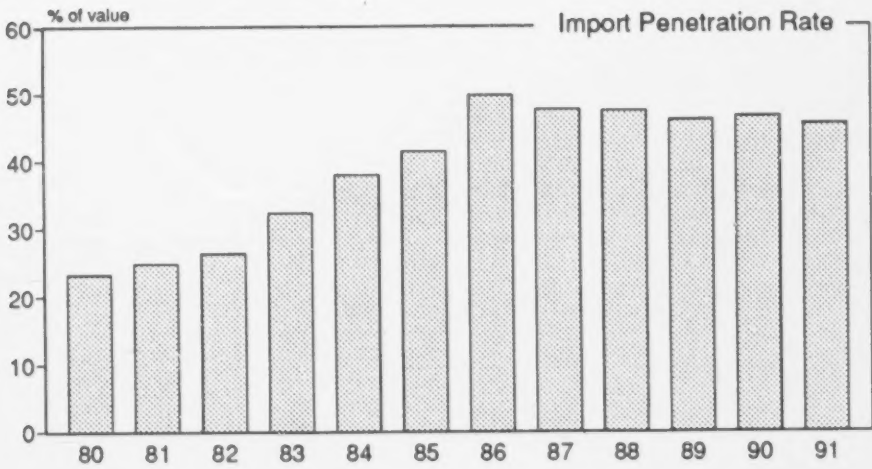
Source: U.S. Bureau of the Census

U.S. machine tool consumption during 1991 fell 7% from 1990 to \$4.3 billion, the lowest level since 1988.



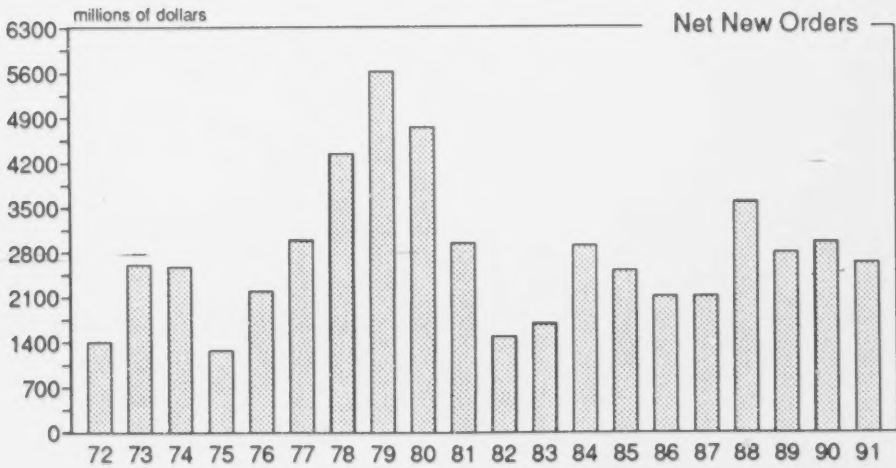
Sources: U.S. Bureau of the Census and AMT

Imports as a share of consumption fell to 45.4%, down from 46.5% in 1990.



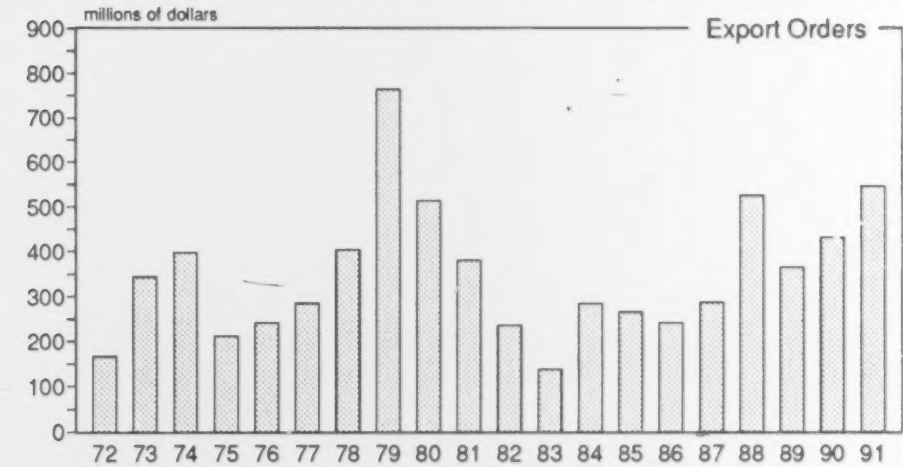
Sources: U.S. Bureau of the Census and AMT

U.S. machine tool net new orders fell to \$2.6 billion according to AMT estimates, down 12% from 1990.



Source: U.S. Bureau of the Census

However, export orders jumped 26%, reaching their second highest level ever.

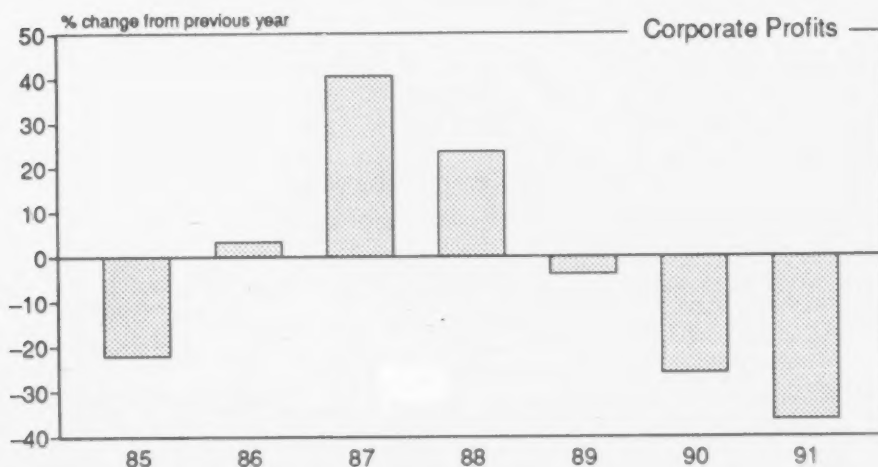


Source: U.S. Bureau of the Census

*The consensus forecast among machine tool analysts points to a slight gain in orders during 1992, with possible significant gains in 1993. The positive outlook reflects improving domestic conditions, particularly in the automotive industry.

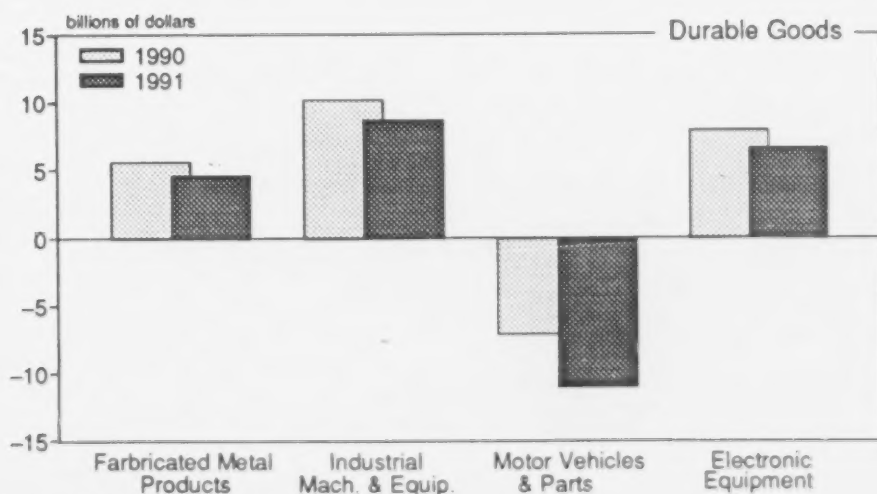
U.S. INDUSTRIAL PERFORMANCE AND INVESTMENT

Corporate profits in the durable goods industry fell 36% during 1991 to \$23.7 billion.



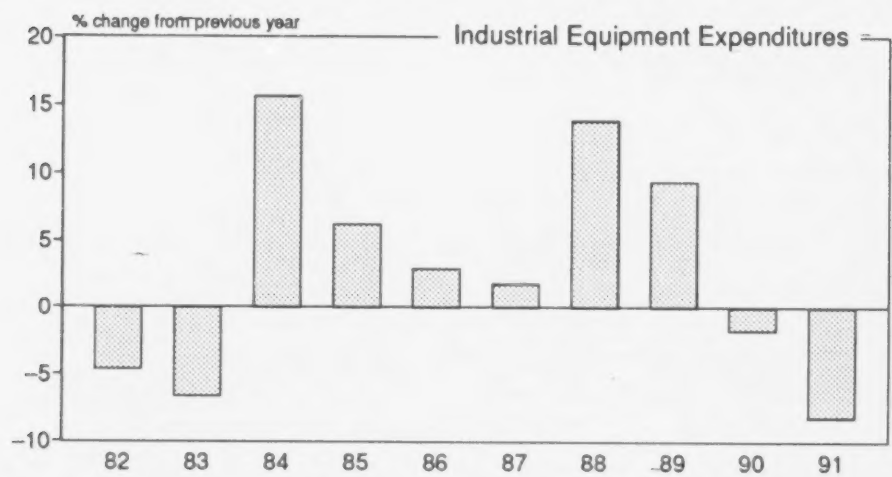
Source: U.S. Bureau of the Census

Corporate profits declined across the board; the motor vehicles and equipment sector lost \$11 billion, compared with a \$7 billion loss in 1990.



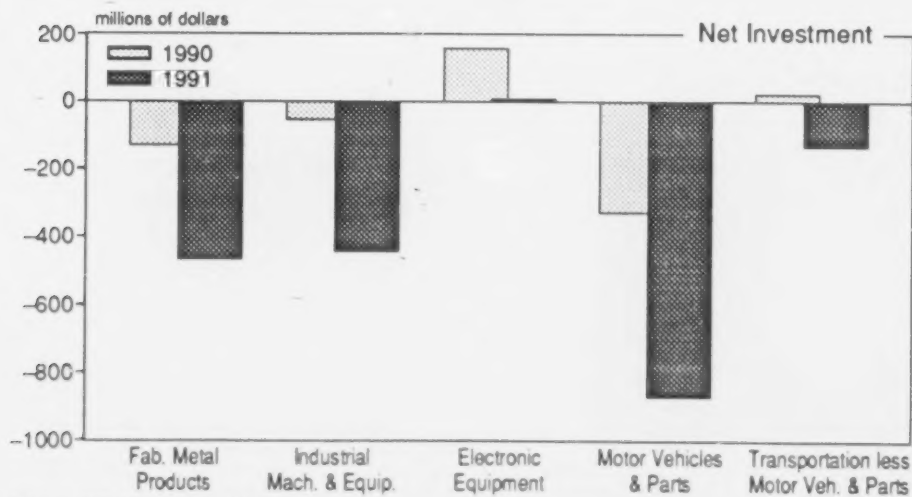
Source: U.S. Bureau of the Census

Weak profits combined with the slow U.S. economy to dampen spending on industrial equipment, down 8% from 1990 to \$84.1 billion.



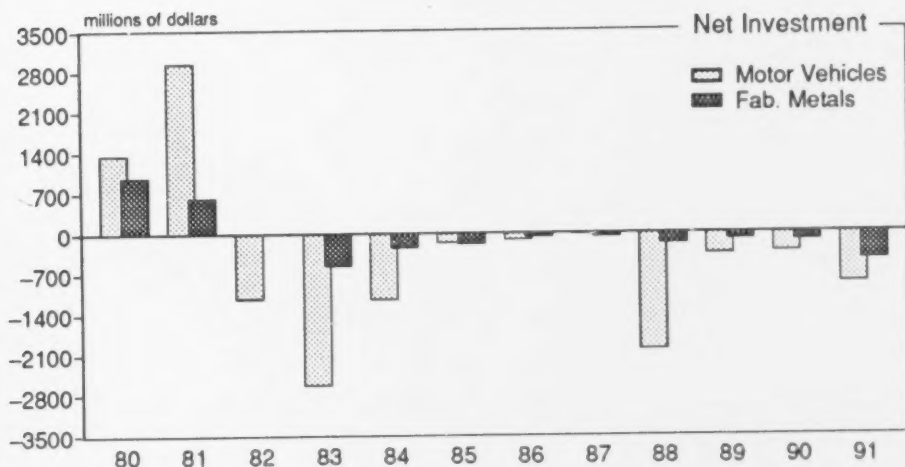
Source: U.S. Bureau of the Census

Not only did most major U.S. metalworking customers lower investment in 1991, but net investment (less depreciation) was actually negative in most instances.



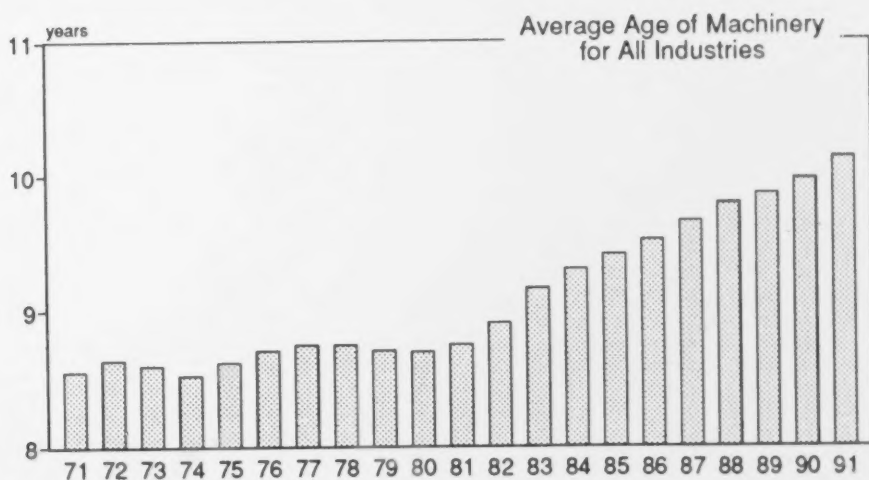
Source: U.S. Bureau of the Census

The motor vehicle and equipment and fabricated metals industry have recorded negative net investment each year since the early 1980s.



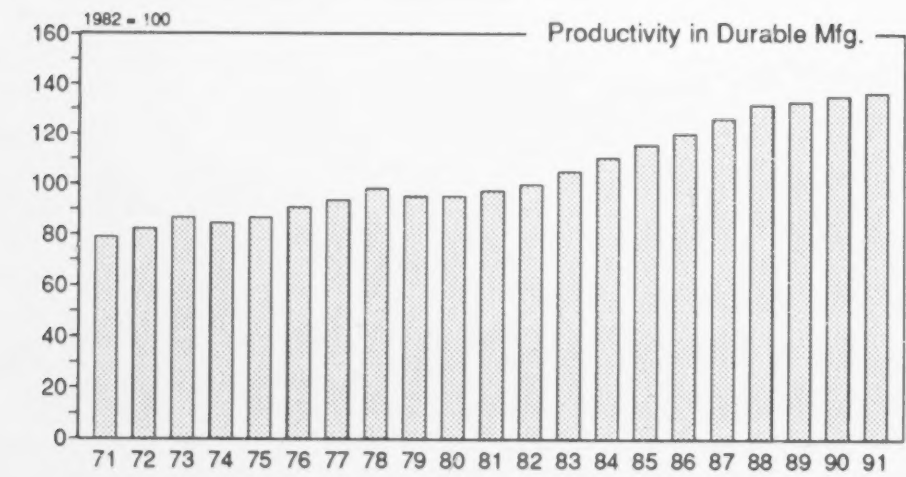
Source: U.S. Bureau of the Census

At the same time, the average age of machinery in use is at record levels for most industries.



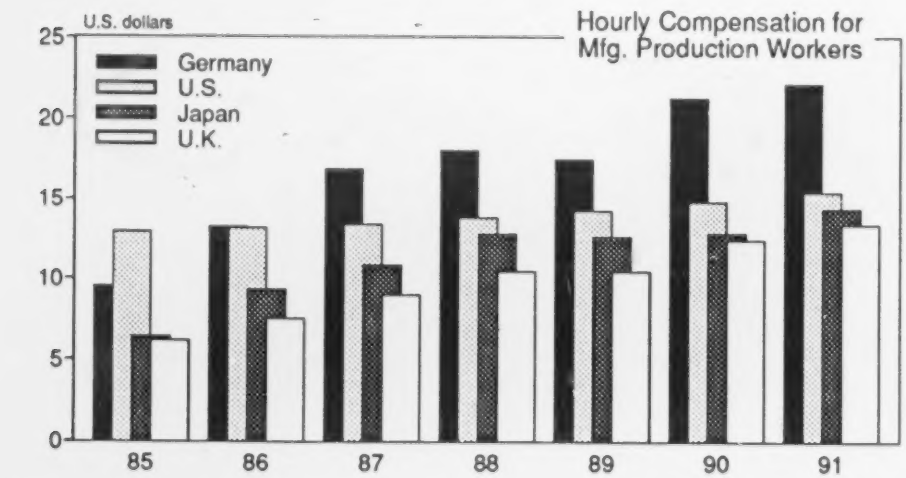
Source: U.S. Bureau of the Census

However, U.S. manufacturing competitiveness seems to be improving.



Source: U.S. Bureau of the Census

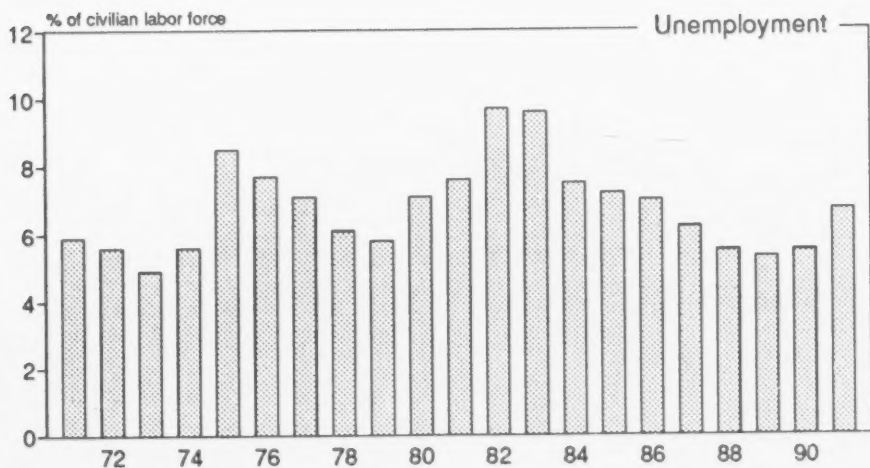
And U.S. real wages are competitive with other nations.



Source: U.S. Bureau of the Census

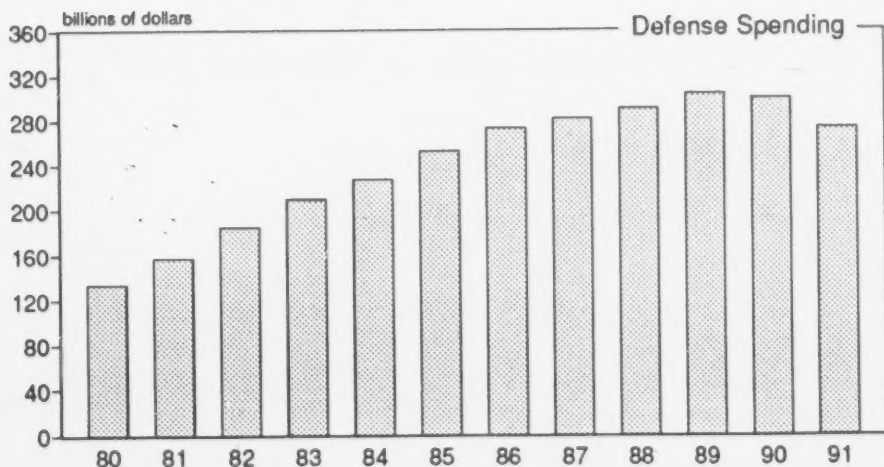
THE U.S. MACROECONOMY

While the economy seems to be recovering, gains are much slower compared with historical economic upturns. Cost-cutting and restructuring of business continues to weaken the job market.



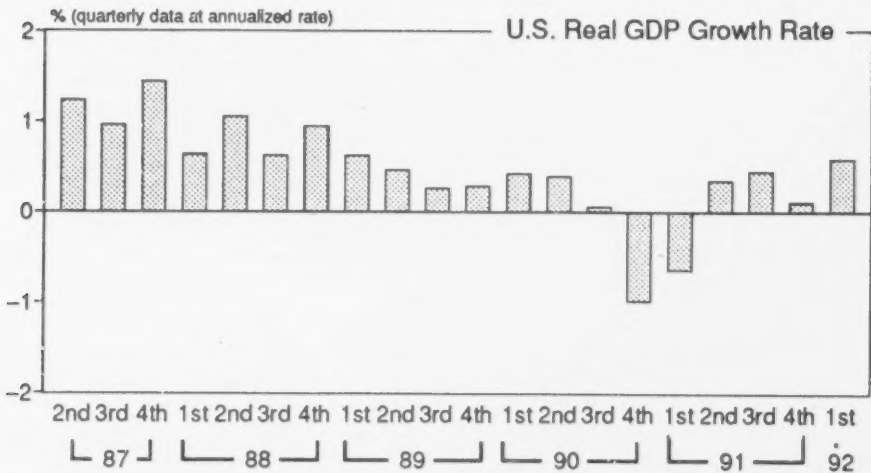
Source: U.S. Bureau of Labor Statistics

Defense cuts are accelerating.



Source: U.S. Bureau of the Census

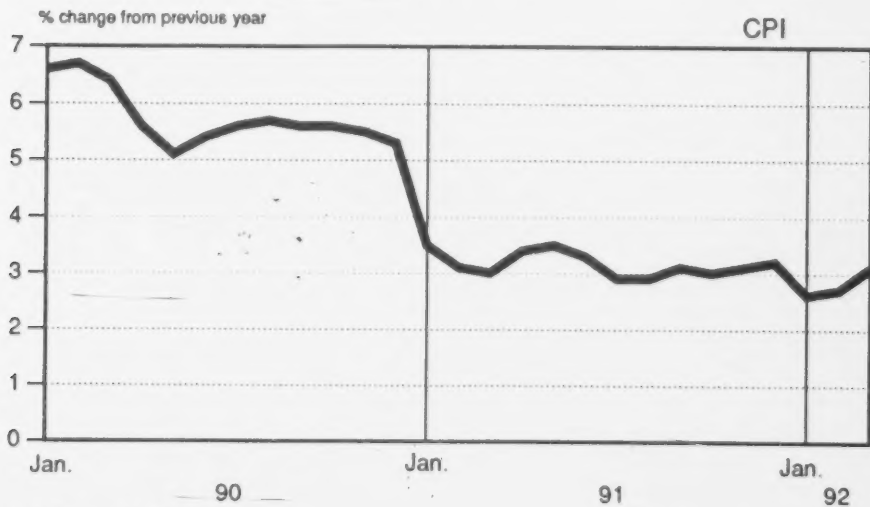
But when defined as two or more consecutive quarters of falling real GDP, the U.S. economy seems firmly out of recession.



Source: U.S. Bureau of Economic Analysis

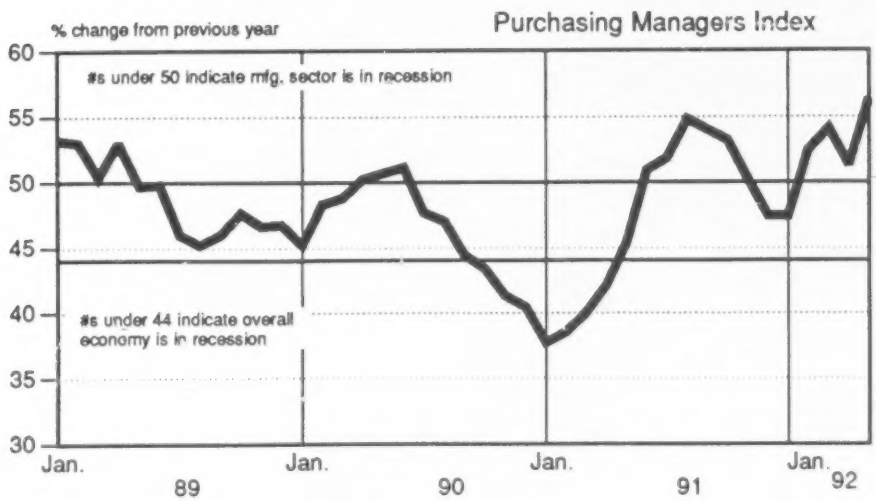
**MOST ECONOMIC INDICATORS
ALSO SEEM TO BE FAVORABLE**

Inflation is under control.



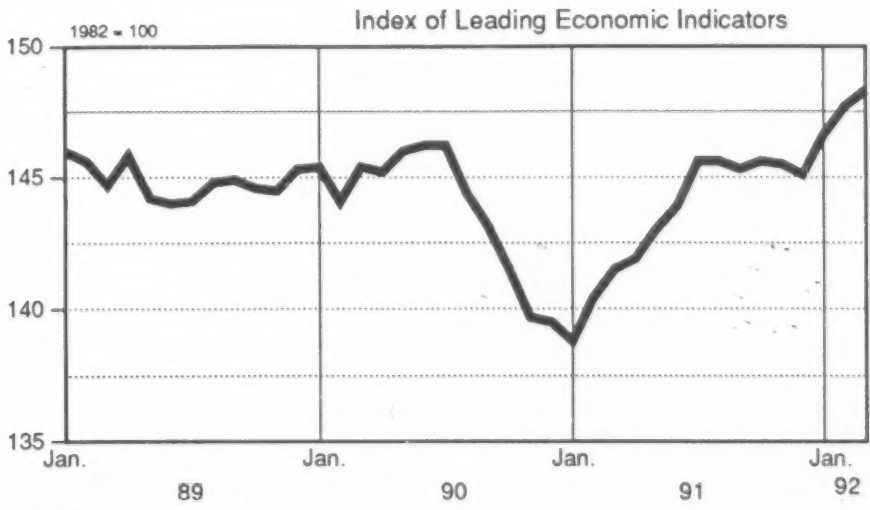
Source: U. S. Bureau of Labor Statistics

The purchasing managers index indicates that manufacturing is growing.



Source: National Association of Purchasing Managers

While the government's index of leading economic indicators is also on the rise.

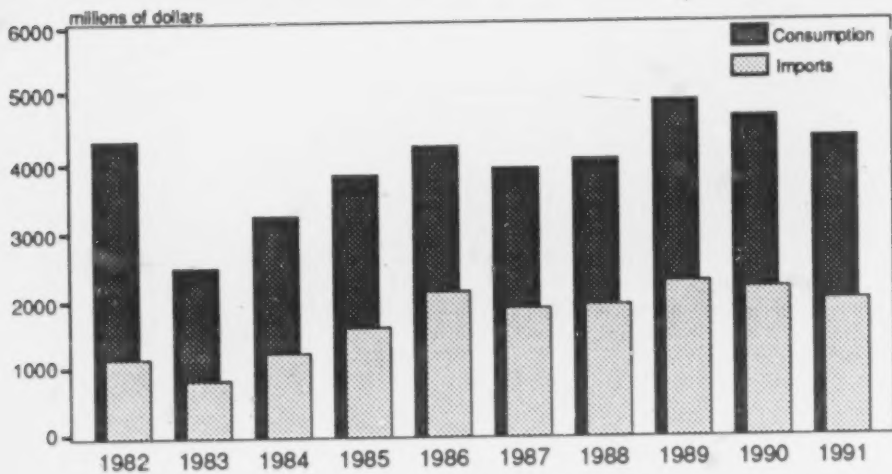


Source: U.S. Bureau of Economic Analysis

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VALUE
(in millions of dollars)

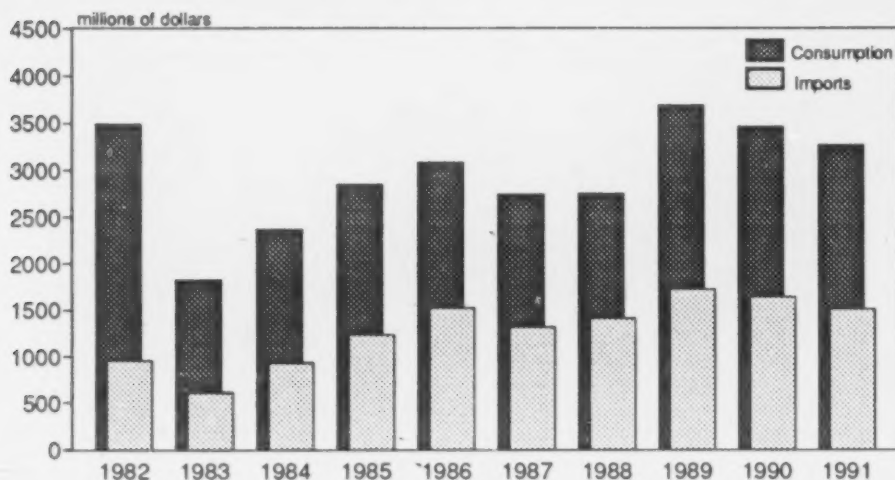
Year	Shipments	+	Imports	-	Exports	=	U.S. Consumption	% Import Penetration
1982	\$3,738.4		\$1,144.1		\$556.5		\$4,325.9	26.4%
1983	1,986.2		832.4		345.0		2,473.6	33.7%
1984	2,362.2		1,218.9		360.9		3,220.2	37.9%
1985	2,623.6		1,582.1		387.1		3,818.6	41.4%
1986	2,655.6		2,105.8		530.7		4,230.7	49.8%
1987	2,612.1		1,859.9		567.7		3,904.2	47.6%
1988	2,795.2		1,913.4		670.9		4,037.8	47.4%
1989	3,453.4		2,246.3		812.3		4,887.4	46.6%
1990(r)	3,382.1		2,147.9		908.3		4,621.6	46.5%
1991(p)	3,265.9 E		1,971.0		896.9		43,40.1	45.4%

UNITS

Year	Shipments	+	Imports	-	Exports	=	U.S. Consumption	% Import Penetration
1982	53,141		35,286		9,017		79,410	44.4%
1983	43,199		24,864		5,654		62,409	39.8%
1984	49,515		37,062		6,601		79,976	46.3%
1985	50,108		47,014		7,602		89,520	52.5%
1986	45,981		47,008		8,428		84,561	55.6%
1987	43,028		37,975		9,447		71,556	53.1%
1988	50,992		42,740		12,468		81,264	52.6%
1989	52,114		50,035		17,981		84,168	59.4%
1990(r)	46,302		46,988		20,544		72,746	64.6%
1991(p)	39,727 E		33,585		18,436		54,876	61.2%

Source: U.S. Department of Commerce

Note: Data includes only machines valued over \$2,500 (through 1990) \$3,025 (1991).



VALUE

(in millions of dollars)

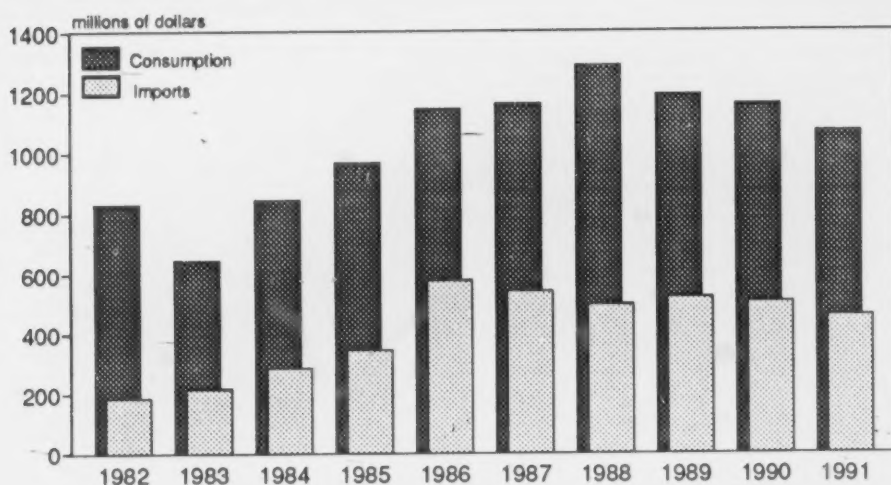
Year	Shipments	+	Imports	-	Exports	=	U.S. Consumption	% Import Penetration
1982	\$2,899.4		\$ 956.7		\$361.8		\$3,494.3	27.4%
1983	1,432.2		613.6		220.3		1,825.5	33.6%
1984	1,654.2		933.2		213.9		2,373.5	39.3%
1985	1,846.8		1,235.0		232.8		2,849.1	43.3%
1986	1,880.5		1,526.7		322.1		3,085.2	49.4%
1987	1,748.7		1,316.9		324.2		2,741.3	48.0%
1988	1,698.6		1,415.0		366.7		2,746.9	51.5%
1989	2,391.0		1,723.0		419.9		3,694.2	46.6%
1990(r)	2,339.4		1,640.5		518.3		3,461.6	47.4%
1991(p)	2,254.9		1,510.9		496.5		3,269.2	46.2%

UNITS

Year	Shipments	+	Imports	-	Exports	=	U.S. Consumption	% Import Penetration
1982	35,060		30,652		5,731		59,981	51.1%
1983	27,088		19,979		3,442		43,625	45.8%
1984	31,741		29,707		3,891		57,557	51.6%
1985	31,425		38,182		4,431		65,176	58.6%
1986	27,991		37,204		5,384		59,811	62.2%
1987	25,449		29,355		5,351		49,453	59.4%
1988	30,445		34,249		6,641		58,053	59.0%
1989	31,566		36,450		9,435		58,581	62.2%
1990(r)	25,978		35,860		11,671		50,167	71.5%
1991(p)	23,593		24,668		10,286		37,975	65.0%

Source: U.S. Department of Commerce

Note: Data includes only machines valued over \$2,500 (through 1990) \$3,025 (1991).



VALUE

(in millions of dollars)

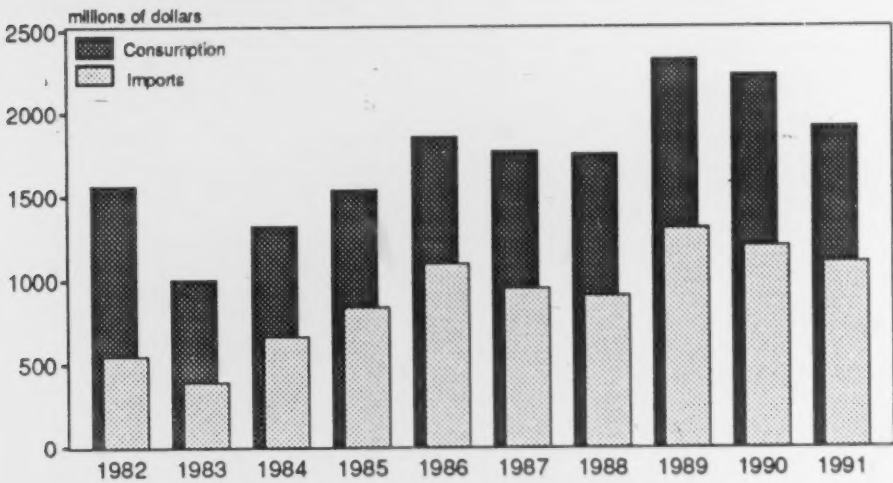
Year	Shipments	+	Imports	-	Exports	=	U.S. Consumption	% Import-Penetration
1982	\$ 839.0		\$187.4		\$194.7		\$ 831.7	22.5%
1983	554.0		218.8		124.7		648.1	33.8%
1984	708.0		285.7		147.0		846.7	33.7%
1985	776.7		347.2		154.4		969.5	35.8%
1986	775.1		579.1		208.7		1,145.5	50.5%
1987	863.3		543.1		243.5		1,162.9	46.7%
1988	1,096.6		498.4		304.1		1,290.9	38.6%
1989	1,062.3		523.3		392.4		1,193.2	43.9%
1990(r)	1,042.7		507.4		390.0		1,160.0	43.7%
1991(p)	1,011.1 E		460.2		400.3		1,070.9	43.0%

UNITS

Year	Shipments	+	Imports	-	Exports	=	U.S. Consumption	% Import-Penetration
1982	18,081		4,634		3,286		19,429	23.9%
1983	16,111		4,885		2,212		18,784	26.0%
1984	17,774		7,355		2,710		22,419	32.8%
1985	18,683		8,832		3,171		24,344	36.3%
1986	17,990		9,804		3,044		24,750	39.6%
1987	17,579		8,620		4,096		22,103	39.0%
1988	20,547		8,491		5,827		23,211	36.6%
1989	20,548		13,585		8,546		25,587	53.1%
1990(r)	20,324		11,128		8,873		22,579	49.3%
1991(p)	16,134 E		8,917		8,150		16,901	52.8%

Source: U.S. Department of Commerce

Note: Data includes only machines valued over \$2,500 (through 1990) \$3,025 (1991).



VALUE

(in millions of dollars)

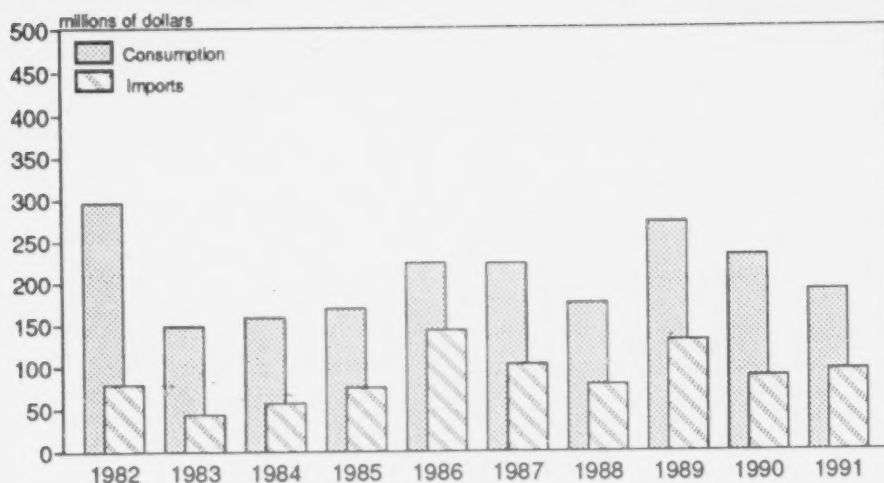
Year	Shipments	+	Imports	-	Exports	=	U.S. Consumption	% Import Penetration
1982	\$1,126.6		\$ 547.8		\$129.5		\$1,544.9	35.5%
1983	677.1		393.2		71.0		999.3	39.3%
1984	739.5		661.3		86.5		1,314.4	50.3%
1985	792.0		834.5		96.2		1,530.3	54.5%
1986	843.5		1,092.9		95.3		1,841.1	59.4%
1987	931.0		947.6		124.0		1,754.6	54.0%
1988	991.9		903.9		157.4		1,738.4	52.0%
1989	1,263.4		1,301.0		253.3		2,311.1	56.3%
1990(r)	1,375.7		1,194.4		355.0		2,215.1	53.9%
1991(p)	1,263.2 E		1,099.8		304.3		2,058.7 E	53.4% E

UNITS

Year	Shipments	+	Imports	-	Exports	=	U.S. Consumption	% Import Penetration
1982	6,066		5,962		1,054		10,974	54.3%
1983	4,781		5,368		621		9,528	56.3%
1984	5,581		8,960		711		13,830	64.8%
1985	5,518		12,922		849		17,591	73.5%
1986	5,901		13,882		862		18,921	73.4%
1987	6,409		10,187		1,122		15,474	65.8%
1988	7,035		11,007		1,598		16,444	66.9%
1989	8,184		14,735		2,661		20,258	72.7%
1990(r)	7,927		11,278		2,697		16,508	68.3%
1991(p)	8,212 E		9,589		2,485		15,316 E	62.6% E

Source: U.S. Department of Commerce

Note: Data includes only machines valued over \$2,500 (through 1990) \$3,025 (1991). Data for production prior to 1986 does not include NC presses, forging machines, and "other" metal forming machine tools.



VALUE

(in millions of dollars)

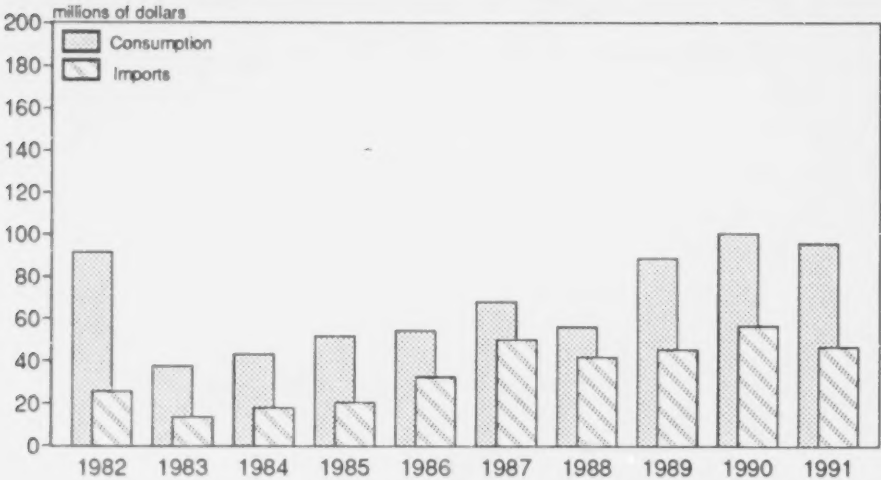
Year	Shipments	+	Imports	-	Exports	=	U.S. Consumption	% Import Penetration
1982	\$247.5 E		\$ 79.9		\$30.2		\$297.2 E	26.9% E
1983	125.6		44.5		21.2		148.9	29.9%
1984	123.6		57.4		22.0		159.0	36.1%
1985	120.1		75.6		25.7		170.0	44.5%
1986	114.0		143.6		33.8		223.9	64.2%
1987	145.1		103.0		25.0		223.1	46.5%
1988	125.2		78.5		27.8		175.9	44.6%
1989	174.2		131.2		32.5		272.8	48.1%
1990(r)	175.3		88.2		33.8		229.7	38.4%
1991(p)	133.3		95.6		38.3		190.6	54.6%

UNITS

Year	Shipments	+	Imports	-	Exports	=	U.S. Consumption	% Import Penetration
1982	2,475 E		4,245		536		6,184 E	68.6% E
1983	1,280		1,734		391		2,623	66.1%
1984	1,448		1,558		422		2,584	60.3%
1985	1,874		2,119		363		3,630	58.4%
1986	1,773		2,218		478		3,513	63.1%
1987	1,843		2,156		525		3,474	62.1%
1988	2,359		2,110		494		3,975	53.1%
1989	3,132		2,608		1,004		4,736	55.1%
1990(r)	2,017		2,104		1,128		2,993	70.3%
1991(p)	2,837		1,701		1,420		3,118	50.2%

Source: U.S. Department of Commerce

Note: Data includes only machines valued over \$2,500 (through 1990) \$3,025 (1991).



VALUE

(in millions of dollars)

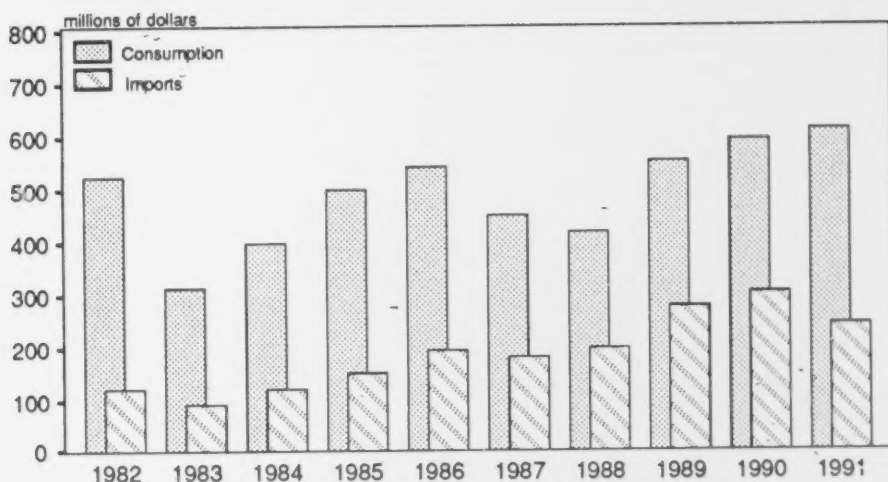
Year	Shipments	+	Imports	-	Exports	=	U.S. Consumption	% Import Penetration
1982	\$ 86.5		\$25.8		\$20.5 E		\$ 91.9 E	28.1%
1983	35.8		13.8		11.8		37.8	36.7%
1984	42.4		18.1		17.3		43.2	41.9%
1985	51.8		20.5		20.4		51.8	39.5%
1986	57.3		32.6		35.6		54.3	60.1%
1987	59.6		50.0		41.5		68.1	73.4%
1988	48.9		41.8		34.5		56.2	74.4%
1989	97.3		45.5		53.9		88.9	49.8%
1990(r)	102.7		56.8		58.9		100.6	56.5%
1991(p)	115.2		46.9		66.2		95.9	48.9%

UNITS

Year	Shipments	+	Imports	-	Exports	=	U.S. Consumption	% Import Penetration
1982	445		281		155 E		571 E	49.2% E
1983	158		153		65		246	62.2%
1984	199		328		94		443	74.0%
1985	243		301		105		439	68.6%
1986	253		557		235		575	96.9%
1987	204		509		198		515	98.8%
1988	164		658		236		586	112.3%
1989	249		748		294		703	106.4%
1990(r)	233		526		256		503	104.6%
1991(p)	330		388		305		413	93.9%

Source: U.S. Department of Commerce

Note: Data includes only machines valued over \$2,500 (through 1990) \$3,025 (1991).



VALUE

(in millions of dollars)

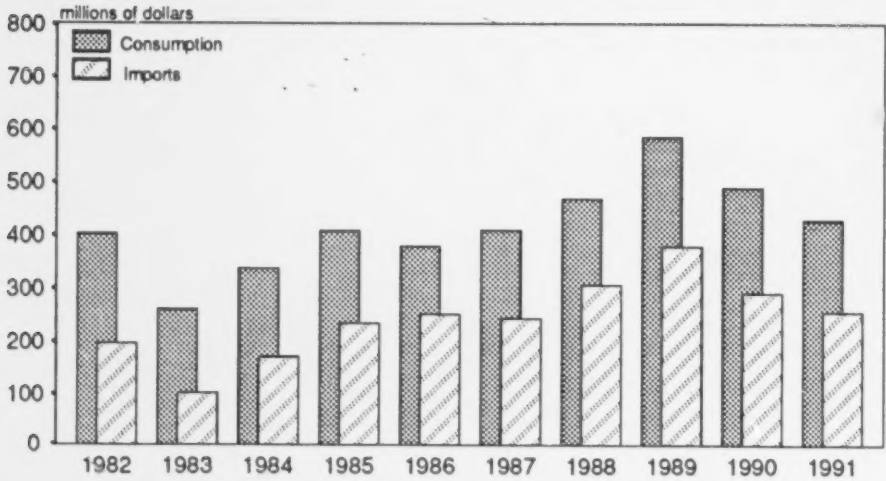
Year	Shipments	+	Imports	-	Exports	=	U.S. Consumption	% Import Penetration
1982	\$473.5		\$117.6		\$ 71.1		\$519.9	22.6%
1983	268.7		89.5		49.0		309.3	28.9%
1984	321.8		118.5		46.7		393.7	30.1%
1985	404.2		147.9		56.6		495.5	29.9%
1986	408.3		190.0		60.4		537.9	35.3%
1987	371.6		177.6		103.7		445.5	39.9%
1988	344.7		194.7		125.8		413.6	47.1%
1989	403.9		273.6		128.4		549.1	49.8%
1990(r)	419.6		300.1		130.6		589.1	50.9%
1991(p)	476.4		239.5		107.7		608.2	39.4%

UNITS

Year	Shipments	+	Imports	-	Exports	=	U.S. Consumption	% Import Penetration
1982	9,711		4,530		1,877		12,364	36.6%
1983	6,352		3,282		930		8,704	37.7%
1984	8,575		5,249		999		12,825	40.9%
1985	9,160		6,746		1,365		14,541	46.4%
1986	7,907		6,611		1,164		13,354	49.5%
1987	7,214		5,885		1,901		11,198	52.6%
1988	8,107		6,565		2,606		12,066	54.4%
1989	7,692		8,105		3,956		11,841	68.4%
1990(r)	6,432		8,426		4,026		10,832	77.8%
1991(p)	6,266		5,628		3,527		8,367	67.3%

Source: U.S. Department of Commerce

Note: Data includes only machines valued over \$2,500 (through 1990) \$3,025 (1991).



VALUE

(in millions of dollars)

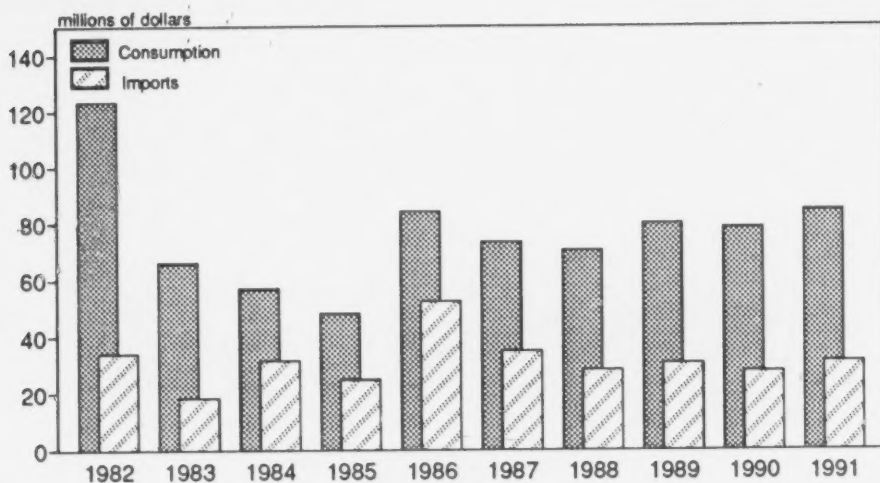
Year	Shipments	+	Imports	-	Exports	=	U.S. Consumption	% Import Penetration
1982	\$238.6		\$194.1		\$30.4		\$402.2	48.2%
1983	173.2		98.9		13.7		258.4	38.3%
1984	177.9		168.5		10.5		335.9	50.2%
1985	189.7		232.4		15.3		406.8	57.1%
1986	143.6		249.4		15.5		377.5	66.1%
1987	183.1		242.3		17.3		408.1	59.4%
1988	194.4		304.9		31.2		468.1	65.1%
1989	234.5		377.9		27.2		585.2	64.6%
1990(r)	242.9		289.6		43.9		488.6	59.3%
1991(p)	203.9		253.8		36.0		421.7	60.2%

UNITS

Year	Shipments	+	Imports	-	Exports	=	U.S. Consumption	% Import Penetration
1982	1,295		2,490		215		3,570	69.7%
1983	1,103		1,609		132		2,580	62.4%
1984	1,332		2,758		114		3,976	69.4%
1985	1,344		3,986		138		5,192	76.8%
1986	1,071		4,986		168		5,889	84.7%
1987	1,530		3,696		161		5,065	73.0%
1988	1,836		4,208		230		5,814	72.4%
1989	2,130		4,139		246		6,023	68.7%
1990(r)	1,973		2,941		409		4,505	65.3%
1991(p)	1,695		2,461		311		3,845	64.0%

Source: U.S. Department of Commerce

Note: Data includes only machines valued over \$2,500 (through 1990) \$3,025 (1991).



VALUE

(in millions of dollars)

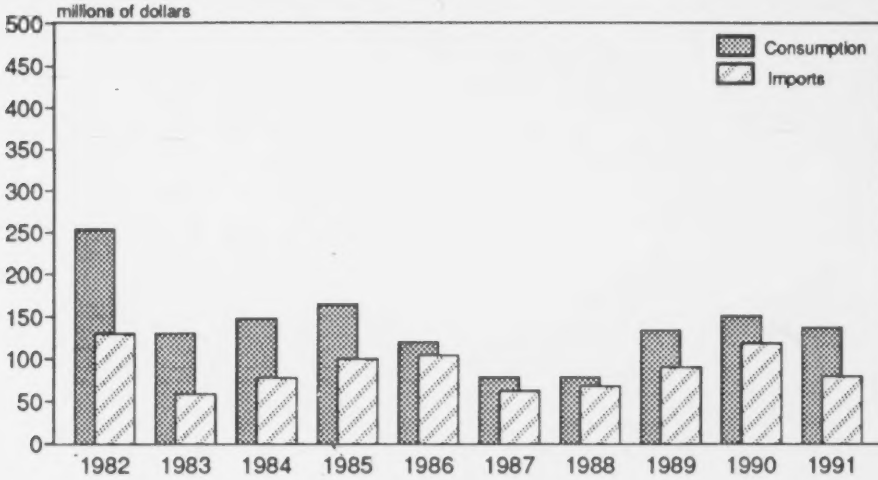
Year	Shipments	+ Imports	- Exports	= U.S. Consumption	% Import Penetration
1982	\$94.8	\$34.2	\$ 5.4	\$123.6	27.7%
1983	51.3	18.4	3.6	66.1	27.9%
1984	29.9	31.7	4.7	57.0	55.7%
1985	35.5	25.0	12.4	48.2	52.0%
1986	44.5	52.5	12.7	84.3	62.2%
1987	42.6	34.9	4.1	73.4	47.5%
1988	44.5	28.4	2.7	70.3	40.5%
1989	52.2	30.8	2.8	80.1	38.4%
1990(r)	63.7	27.9	13.2	78.4	35.6%
1991(p)	63.1	31.2	2.5	91.8	34.0%

UNITS

Year	Shipments	+ Imports	- Exports	= U.S. Consumption	% Import Penetration
1982	194	317	28	483	65.6%
1983	99	232	18	313	74.1%
1984	165	445	26	584	76.2%
1985	76	339	107	308	110.1%
1986	92	710	59	743	95.6%
1987	96	349	25	420	83.1%
1988	94	251	23	322	78.0%
1989	96	156	20	232	84.3%
1990(r)	105	175	72	208	84.1%
1991(p)	95	119	31	183	65.0%

Source: U.S. Department of Commerce

Note: Data includes only machines valued over \$2,500 (through 1990) \$3,025 (1991).



VALUE
(in millions of dollars)

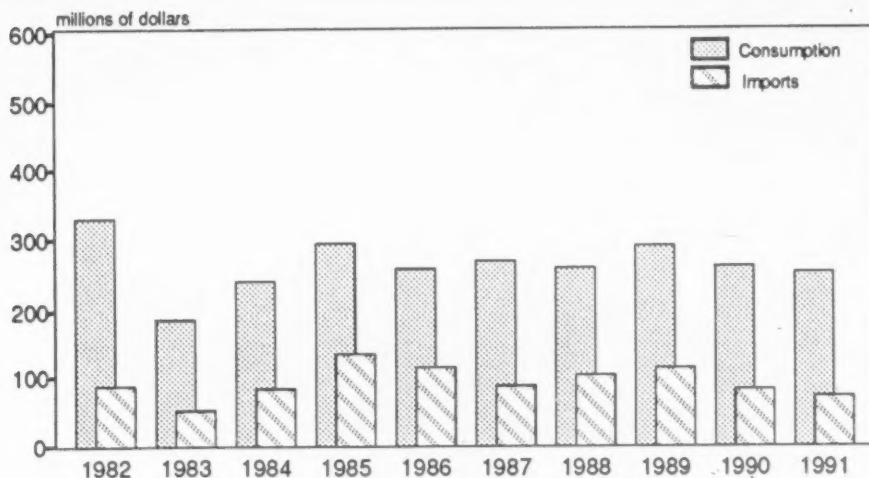
Year	Shipments	+	Imports	-	Exports	=	U.S. Consumption	% Import Penetration
1982	\$173.4		\$130.0		\$49.1		\$254.3	51.1%
1983	95.7		58.4		23.3		130.8	44.6%
1984	99.7		78.0		30.2		147.5	52.9%
1985	93.4		100.1		28.8		164.8	60.8%
1986	73.9		104.3		58.6		119.6	87.2%
1987	57.8		62.4		41.5		78.8	79.2%
1988	43.5		67.7		32.8		78.4	86.4%
1989	56.5		90.3		13.1		133.7	67.5%
1990(r)	49.1		118.6		16.9		150.9	78.6%
1991(p)	74.0		79.2		15.8		137.5	57.6%

UNITS

Year	Shipments	+	Imports	-	Exports	=	U.S. Consumption	% Import Penetration
1982	2,772		8,546		830		10,488	81.5%
1983	2,243		4,999		572		6,670	74.9%
1984	2,758		6,018		866		9,314	75.7%
1985	2,400		7,780		830		7,946	83.5%
1986	1,874		6,359		2,063		6,170	103.1%
1987	1,413		4,529		991		4,951	91.5%
1988	1,387		5,021		895		5,513	91.1%
1989	1,553		5,559		518		6,594	84.3%
1990(r)	1,169		8,388		790		8,767	95.7%
1991(p)	963		4,745		541		5,167	91.8%

Source: U.S. Department of Commerce

Note: Data includes only machines valued over \$2,500 (through 1990) \$3,025 (1991).



VALUE

(in millions of dollars)

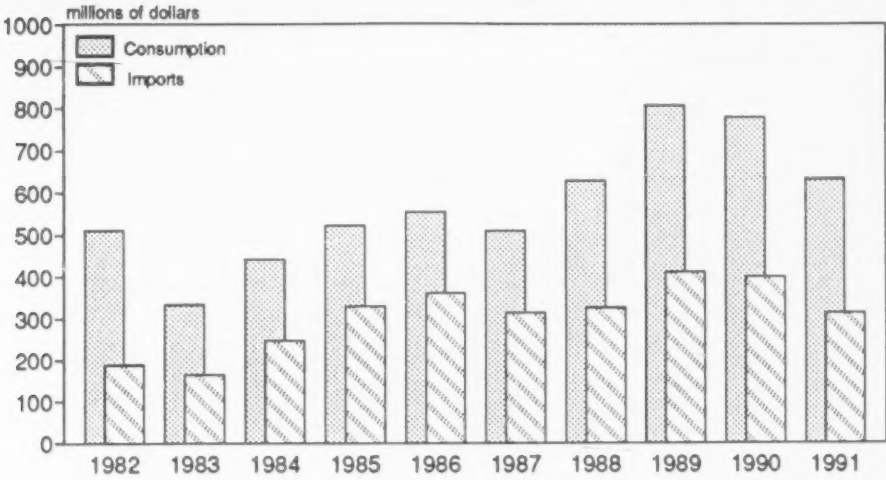
Year	Shipments	+	Imports	-	Exports	=	U.S. Consumption	% Import Penetration
1982	\$265.0		\$87.7		\$22.4		\$330.3	26.5%
1983	145.7		52.5		13.9		184.2	28.5%
1984	179.0		83.4		22.7		239.8	34.8%
1985	180.0		133.7		19.3		294.4	45.4%
1986	168.3		113.8		25.2		256.9	44.2%
1987	206.0		87.4		24.7		268.7	32.5%
1988	183.8		103.1		28.2		258.7	39.8%
1989	205.0		112.5		27.2		290.3	38.7%
1990(r)	213.5		82.0		35.0		260.5	31.5%
1991(p)	214.2		71.5		34.3		251.4	28.4%

UNITS

Year	Shipments	+	Imports	-	Exports	=	U.S. Consumption	% Import Penetration
1982	6,816		5,985		331		12,470	48.0%
1983	6,211		3,660		187		9,684	37.8%
1984	7,535		6,471		209		13,797	46.9%
1985	7,988		7,736		333		15,391	50.3%
1986	7,228		6,551		227		13,552	48.3%
1987	5,589		4,766		330		10,025	47.5%
1988	7,267		6,217		303		13,181	47.2%
1989	6,072		6,182		521		11,733	52.7%
1990(r)	4,454		5,312		443		9,323	57.0%
1991(p)	3,261		3,281		575		5,967	55.0%

Source: U.S. Department of Commerce

Note: Data includes only machines valued over \$2,500 (through 1990) \$3,025 (1991).



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VALUE
(in millions of dollars)

Year	Shipments	+	Imports	-	Exports	=	U.S. Consumption	% Import Penetration
1982	\$357.6		\$188.9		\$34.0		\$512.5	36.9%
1983	182.9		164.9		13.3		334.5	49.3%
1984	213.2		248.0		18.6		442.6	56.0%
1985	214.7		330.0		21.0		523.7	63.0%
1986	213.4		361.8		20.5		554.7	65.2%
1987	217.8		313.4		20.6		510.7	61.4%
1988	334.5		326.3		30.8		629.9	51.8%
1989	442.2		410.5		45.7		807.0	50.9%
1990(r)	437.0		399.9		56.6		780.3	51.3%
1991(p)	379.7		312.6		58.9		633.5	49.4%

UNITS

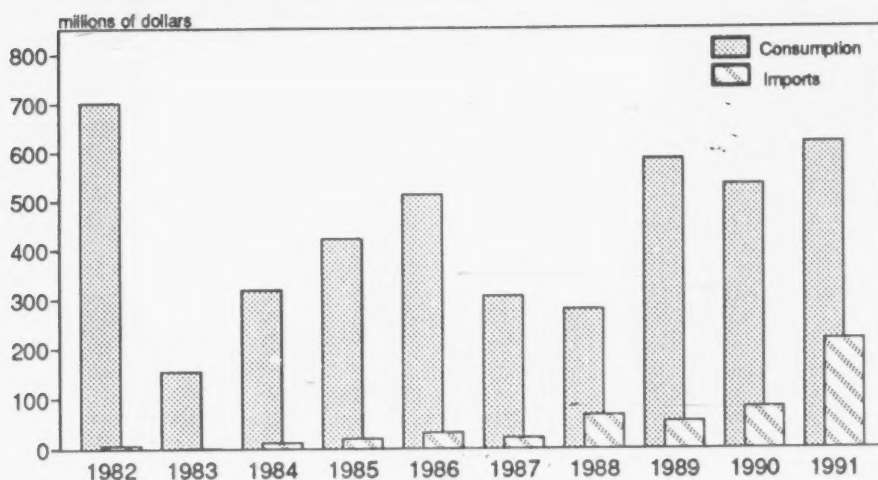
Year	Shipments	+	Imports	-	Exports	=	U.S. Consumption	% Import Penetration
1982	1,396		1,873		195		3,074	60.9%
1983	1,005		1,936		102		2,839	68.2%
1984	1,237		2,911		117		4,031	72.2%
1985	1,077		4,188		156		5,109	82.0%
1986	918		4,037		131		4,824	83.7%
1987	1,361		2,914		202		4,073	71.5%
1988	2,035		2,919		283		4,671	62.5%
1989	2,557		3,810		380		5,987	63.6%
1990(r)	2,327		3,021		388		4,960	60.9%
1991(p)	2,225		2,636		297		4,564	57.8%

Source: U.S. Department of Commerce

Note: Data includes only machines valued over \$2,500 (through 1990) \$3,025 (1991).

U.S. MACHINE TOOL CONSUMPTION

Station-type



VALUE

(in millions of dollars)

Year	Shipments	+	Imports	-	Exports	=	U.S. Consumption	% Import Penetration
1982	\$731.1		\$ 7.4		\$36.4		\$702.2	1.1%
1983	174.0		1.6		21.1		154.5	1.1%
1984	311.9		12.7		5.2		319.5	4.0%
1985	406.1		20.6		4.3		422.4	4.9%
1986	517.7		32.5		37.5		512.8	6.3%
1987	299.6		22.9		16.8		305.7	7.5%
1988	225.4		67.5		13.6		279.3	24.2%
1989	562.9		55.0		31.7		586.2	9.4%
1990(r)	502.1		82.8		51.1		533.8	15.5%
1991(p)	450.4		217.9		48.6		619.7	35.2%

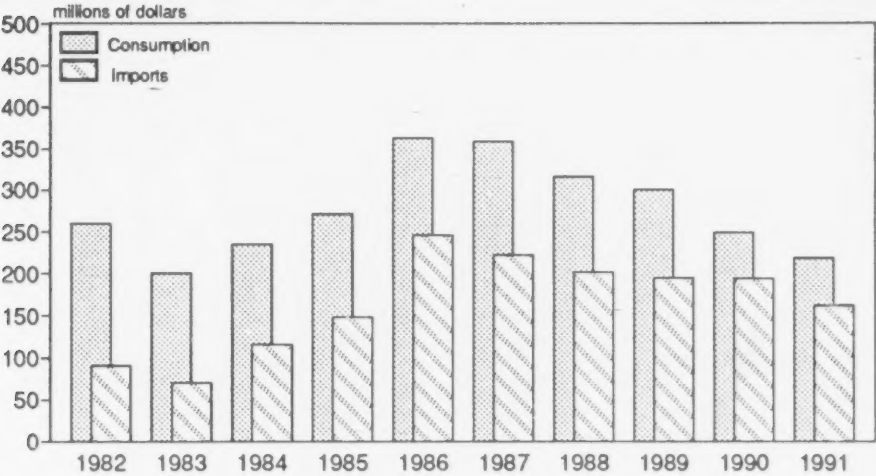
UNITS

Year	Shipments	+	Imports	-	Exports	=	U.S. Consumption	% Import Penetration
1982	792		50		62		780	6.4%
1983	575		7		27		555	1.3%
1984	599		50		15		634	7.9%
1985	531		90		15		606	14.9%
1986	641		92		49		684	13.5%
1987	434		105		36		503	20.9%
1988	283		184		34		433	42.5%
1989	508		193		56		645	29.9%
1990(r)	416		172		82		506	34.0%
1991(p)	336		202		105		433	46.7%

Source: U.S. Department of Commerce

Note: Data includes only machines valued over \$2,500 (through 1990) \$3,025 (1991).

A



VALUE
(in millions of dollars)

Year	Shipments +	Imports -	Exports =	U.S. Consumption	% Import Penetration
1982	\$231.4	\$ 91.2	\$62.3 E	\$260.3 E	35.0% E
1983	179.3	70.9	49.3	201.0	35.3%
1984	154.7	116.7	36.1	235.3	49.6%
1985	151.3	149.1	28.9	271.5	54.9%
1986	139.6	246.2	22.4	363.4	67.7%
1987	165.4	222.9	29.0	359.3	62.0%
1988	153.6	202.2	39.4	316.4	63.9%
1989	162.4	195.8	57.3	300.8	65.1%
1990(r)	133.6	194.4	78.4	249.6	77.9%
1991(p)	144.5	162.7	88.2	219.0	74.3%

UNITS

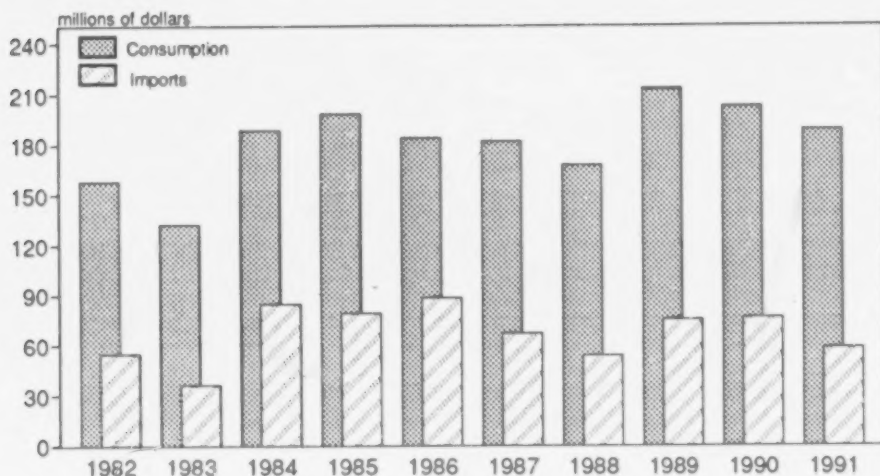
Year	Shipments +	Imports -	Exports =	U.S. Consumption	% Import Penetration
1982	9,164	2,335	1,502	9,997	23.4%
1983	8,062	2,367	1,018	9,411	25.2%
1984	7,893	3,919	1,075	10,737	36.5%
1985	6,732	4,897	983	10,646	46.0%
1986	6,234	5,083	810	10,507	48.4%
1987	5,765	4,446	982	9,229	48.2%
1988	6,913	6,116	1,537	11,492	53.2%
1989	7,577	4,950	2,440	10,087	49.1%
1990(r)	6,852	4,795	4,077	7,570	63.3%
1991(p)	5,585	3,507	3,174	5,918	59.3%

Source: U.S. Department of Commerce

Note: Data includes only machines valued over \$2,500 (through 1990) \$3,025 (1991).

U.S. MACHINE TOOL CONSUMPTION

Punching and Shearing



VALUE

(in millions of dollars)

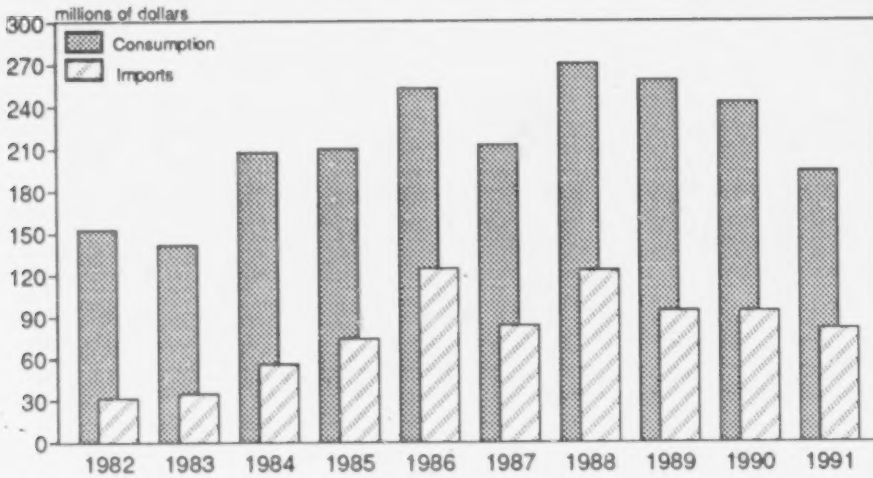
Year	Shipments + Imports	- Exports =	U.S. Consumption	% Import Penetration	
1982	\$136.5	\$54.8	\$32.9	\$158.3	34.6%
1983	114.2	36.4	18.1	132.5	27.5%
1984	126.6	84.8	22.6	188.7	44.9%
1985	137.4	79.4	18.1	198.6	40.0%
1986	117.6	88.4	21.8	184.1	48.0%
1987	137.7	67.1	22.5	182.3	36.8%
1988	162.3	53.6	48.3	167.7	32.0%
1989	195.4	75.3	57.4	213.3	35.3%
1990(r)	195.9	76.5	65.4	207.0	37.0%
1991(p)	185.0	58.1	54.5	188.6	30.8%

UNITS

Year	Shipments + Imports	- Exports =	U.S. Consumption	% Import Penetration	
1982	3,736	1,523	780	4,479	34.0%
1983	2,784	1,263	575	3,472	36.4%
1984	3,164	1,987	569	4,582	43.4%
1985	3,548	2,243	596	5,195	43.2%
1986	3,427	2,248	570	5,105	44.0%
1987	3,518	1,616	757	4,377	36.9%
1988	4,153	1,505	1,333	4,325	34.8%
1989	4,250	1,800	1,267	4,783	37.6%
1990(r)	4,775	1,643	1,569	4,849	33.9%
1991(p)	4,174	992	1,357	3,809	26.0%

Source: U.S. Department of Commerce

Note: Data includes only machines valued over \$2,500 (through 1990) \$3,025 (1991).



A

VALUE

(in millions of dollars)

Year	Shipments	+	Imports	-	Exports	=	U.S. Consumption	% Import Penetration
1982	\$156.5		\$31.7		\$35.1		\$153.2	20.7%
1983	127.0		34.9		19.7		142.2	24.5%
1984	171.2		56.2		19.4		208.1	27.0%
1985	166.7		74.2		30.3		210.6	35.2%
1986	162.0		125.0		33.9		253.2	49.4%
1987	162.6		83.8		33.3		213.0	39.3%
1988	196.0		123.7		49.1		270.7	45.7%
1989	211.1		94.4		46.7		258.8	36.5%
1990(r)	200.7		94.0		73.7		221.0	42.5%
1991(p)	180.8		81.4		68.0		194.2	41.9%

UNITS

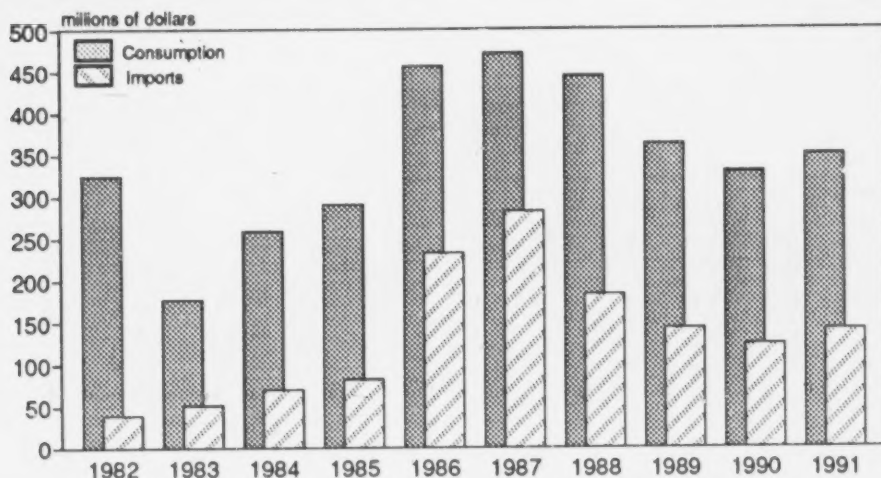
Year	Shipments	+	Imports	-	Exports	=	U.S. Consumption	% Import Penetration
1982	5,990		1,361		807		6,544	20.8%
1983	5,958		1,502		457		7,003	21.4%
1984	6,295		2,288		586		7,997	28.6%
1985	7,042		2,995		698		9,339	32.1%
1986	6,584		3,027		707		8,904	34.0%
1987	6,935		2,243		859		8,319	27.0%
1988	6,794		2,226		1,247		7,773	28.6%
1989	6,643		2,513		1,019		8,137	30.9%
1990(r)	6,565		2,169		1,859		6,875	31.5%
1991(p)	4,948		1,708		1,630		5,026	34.0%

Source: U.S. Department of Commerce

Note: Data includes only machines valued over \$2,500 (through 1990) \$3,025 (1991).

U.S. MACHINE TOOL CONSUMPTION

Presses



VALUE

(in millions of dollars)

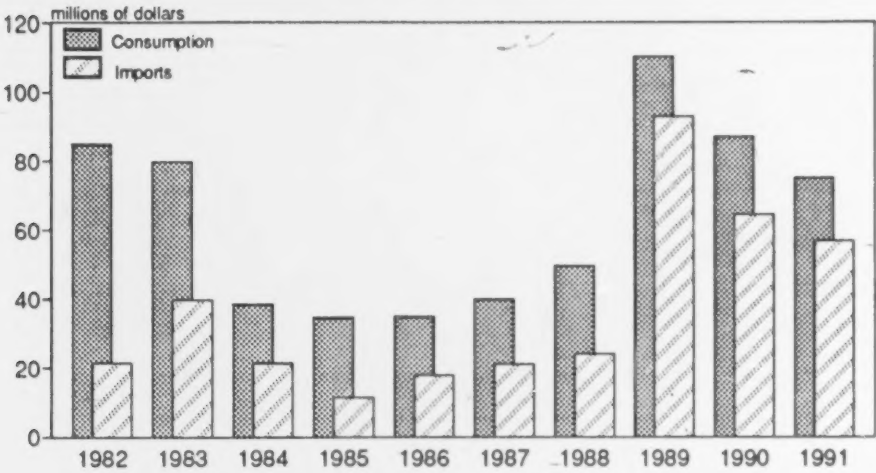
Year	Shipments	+	Imports	-	Exports	=	U.S. Consumption	% Import Penetration
1982	\$338.3		\$ 40.3		\$53.8		\$324.8	12.4%
1983	156.1		52.2		30.0		178.4	29.3%
1984	224.9		70.6		36.0		259.4	27.2%
1985	250.0		83.0		41.7		291.3	28.5%
1986	288.1		232.9		63.5		457.5	50.9%
1987	261.7		282.7		71.1		473.3	59.7%
1988	351.2		183.6		89.2		445.6	41.2%
1989	313.1		142.8		92.4		363.5	39.3%
1990(r)	304.8		124.0		99.2		329.7	37.6%
1991(p)	295.5		141.6		86.7		350.5	40.4%

UNITS

Year	Shipments	+	Imports	-	Exports	=	U.S. Consumption	% Import Penetration
1982	3,147		526		686		2,987	17.6%
1983	2,419		556		433		2,542	21.9%
1984	2,672		875		622		2,925	29.9%
1985	2,611		1,076		964		2,723	39.5%
1986	2,685		1,411		915		3,181	44.4%
1987	2,549		2,186		1,070		3,665	59.6%
1988	3,021		1,434		1,542		2,913	49.2%
1989	3,439		1,971		1,644		3,766	52.3%
1990(r)	3,054		3,527		2,032		4,549	77.5%
1991(p)	2,149		2,880		1,857		3,172	90.8%

Source: U.S. Department of Commerce

Note: Data includes only machines valued over \$2,500 (through 1990) \$3,025 (1991).



VALUE

(in millions of dollars)

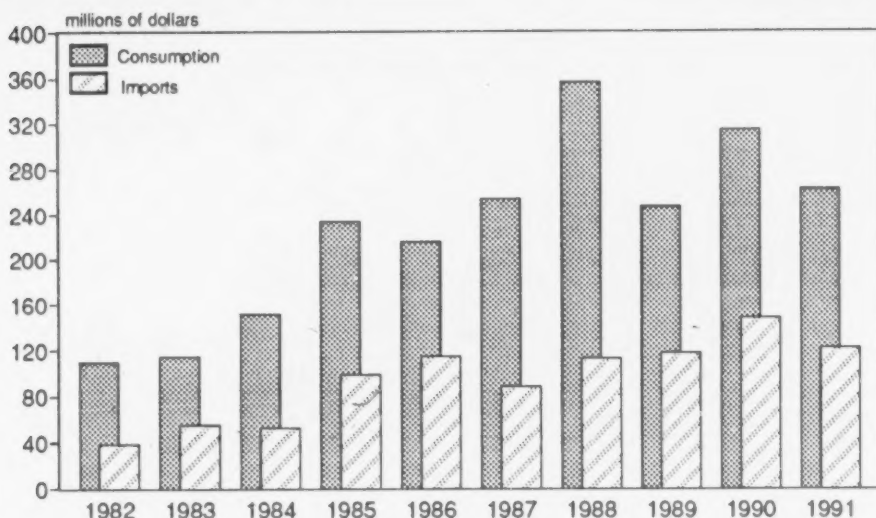
Year	Shipments	+	Imports	-	Exports	=	U.S. Consumption	% Import Penetration
1982	\$79.0		\$21.5		\$15.3		\$ 85.2	25.3%
1983	48.0		39.8		7.9		79.9	49.8%
1984	29.0		21.4		11.8		38.6	55.3%
1985	35.4		11.5		12.2		34.7	33.3%
1986	36.7		17.9		19.7		34.9	51.2%
1987	42.7		21.1		23.9		39.9	52.8%
1988	52.5 E		24.2		27.1		49.7 E	48.8% E
1989	58.5		93.1		41.1		110.5 E	84.3%
1990(r)	73.9		64.5		51.2		87.2 E	73.9%
1991(p)	73.0 E		56.9		54.7		75.2 E	75.7%

UNITS

Year	Shipments	+	Imports	-	Exports	=	U.S. Consumption	% Import Penetration
1982	383		207		190		400	51.8%
1983	263		121		132		252	48.0%
1984	198		288		140		346	83.2%
1985	213		270		183		300	90.0%
1986	142		253		164		231	109.5%
1987	184		303		280		207	146.4%
1988	225 E		215		265		175 E	122.9% E
1989	228		1,554		802		980 E	158.6%
1990(r)	231		988		360		859	115.0%
1991(p)	152 E		764		362		554 E	137.9%

Source: U.S. Department of Commerce

Note: Data includes only machines valued over \$2,500 (through 1990) \$3,025 (1991).



VALUE

(in millions of dollars)

Year	Shipments	+	Imports	-	Exports	=	U.S. Consumption	% Import Penetration
1982	\$128.7		\$39.0		\$57.6		\$110.1	35.4%
1983	108.6		55.6		49.1		115.1	48.3%
1984	156.3		52.8		57.2		151.9	34.8%
1985	187.3		99.0		52.1		234.2	42.3%
1986	170.7		114.8		69.8		215.7	53.2%
1987	258.6		88.4		92.7		254.4	34.7%
1988	334.5		113.2		90.4		357.2	31.7%
1989	284.3		117.7		154.7		247.2	47.6%
1990(r)	267.3		148.4		100.6		315.2	47.1%
1991(p)	276.7		122.2		136.4		262.5	46.6%

UNITS

Year	Shipments	+	Imports	-	Exports	=	U.S. Consumption	% Import Penetration
1982	4,825		1,017		823		5,019	20.3%
1983	4,687		1,443		615		5,515	26.2%
1984	5,395		1,917		743		6,569	29.2%
1985	5,269		2,248		730		6,787	33.2%
1986	5,152		2,865		688		7,329	39.1%
1987	4,393		2,272		1,130		5,535	41.0%
1988	6,354		3,111		1,440		8,025	38.8%
1989	5,988		5,747		3,814		7,921	72.6%
1990(r)	5,699		2,801		3,053		5,447	51.4%
1991(p)	4,767		2,573		2,944		4,396	58.5%

Source: U.S. Department of Commerce

Note: Data includes only machines valued over \$2,500 (through 1990) \$3,025 (1991).

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U.S. Machine Tool Shipments

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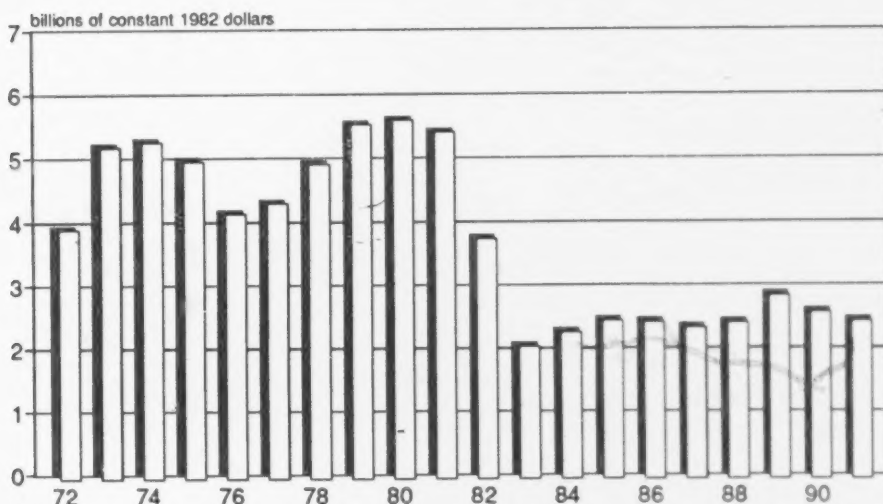
U.S. MACHINE TOOL SHIPMENTS

Metal Cutting and Metal Forming

(in millions of dollars)

Year	Total Shipments		Machines Valued \$2,500* or More		Machines Valued Less Than \$2,500*	
	Units	Value	Units	Value	Units	Value
1982	178,638	\$3,804.3	53,141	\$3,738.4	125,497	\$65.9
1983	150,837	2,144.8	43,199	1,986.2	107,638	58.7
1984	162,438	2,426.4	49,511	2,362.3	112,927	64.1
1985	147,147	2,682.2	50,108	2,623.6	97,039	58.6
1986	134,485	2,709.8	45,589	2,655.6	88,896	54.2
1987	141,120	2,668.7	43,028	2,612.1	98,092	56.6
1988	160,032	2,858.2	50,992	2,795.2	109,040	63.0
1989	150,938	3,514.2	52,114	3,453.4	98,824	60.8
1990(r)	137,282	3,436.1	46,302	3,382.1	90,980	54.0
1991(p)E	115,427	3,312.1	39,727	3,265.9	75,700	46.1

Note: * - \$3,025 in 1991



Constant Dollar Table, Total Shipments

(in millions of 1982 dollars)

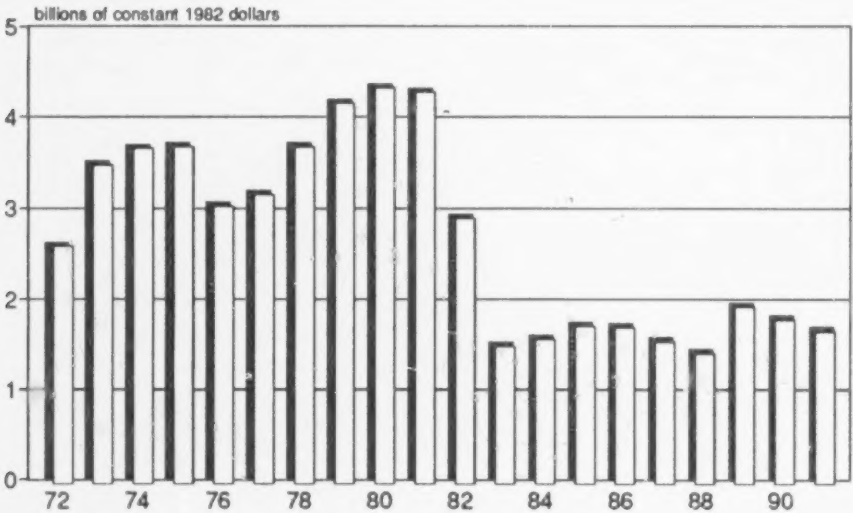
Year	Units	Value	Year	Units	Value
1972	267,065	\$3,954.2	1982	178,638	\$3,804.3
1973	307,680	5,227.6	1983	150,837	2,096.6
1974	337,799	5,308.9	1984	162,438	2,319.7
1975	280,341	5,012.7	1985	147,147	2,502.1
1976	270,875	4,189.0	1986	134,485	2,477.0
1977	284,583	4,350.0	1987	141,120	2,387.1
1978	327,460	4,956.8	1988	160,032	2,470.1
1979	345,218	5,582.5	1989	150,938	2,887.3
1980	323,899	5,648.3	1990(r)	137,282	2,627.4
1981	301,313	5,455.4	1991(p)E	115,427	2,492.2

Source: U.S. Department of Commerce

(in millions of dollars)

Year	Total Shipments		Machines Valued \$2,500* or More		Machines Valued Less Than \$2,500*	
	Units	Value	Units	Value	Units	Value
1982	130,434	\$2,940.6	35,060	\$2,899.4	95,374	\$41.2
1983	100,764	1,564.2	27,088	1,532.2	73,676	32.0
1984	105,740	1,688.3	31,737	1,654.3	74,003	34.0
1985	93,802	1,877.3	31,425	1,846.8	62,377	30.4
1986	89,565	1,911.6	27,677	1,880.5	61,888	31.1
1987	92,711	1,780.7	25,449	1,748.7	67,262	32.0
1988	104,776	1,734.8	30,445	1,698.6	74,331	36.2
1989	103,576	2,428.5	31,556	2,391.1	72,010	37.4
1990(r)	92,823	2,371.3	25,978	2,339.4	66,845	31.9
1991(p)	79,675	2,281.8	23,593	2,254.9	56,082	26.9

Note: * - \$3,025 in 1991



Constant Dollar Table, Total Shipments
(in millions of 1982 dollars)

Year	Units	Value	Year	Units	Value
1972	207,290	\$2,631.8	1982	130,434	\$2,940.6
1973	252,237	3,519.3	1983	100,764	1,532.0
1974	272,811	3,702.9	1984	105,740	1,614.0
1975	229,169	3,722.2	1985	93,802	1,749.6
1976	212,757	3,073.8	1986	89,565	1,744.2
1977	220,017	3,198.7	1987	92,711	1,581.4
1978	257,647	3,717.2	1988	104,776	1,477.7
1979	263,019	4,195.0	1989	103,576	1,968.0
1980	248,563	4,367.1	1990(r)	92,823	1,826.9
1981	234,647	4,323.7	1991(p)	79,675	1,695.2

Source: U.S. Department of Commerce

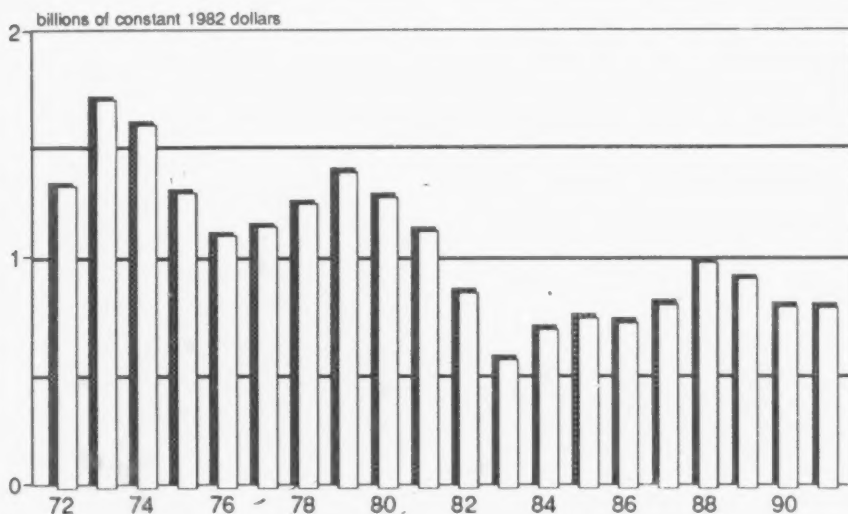
U.S. MACHINE TOOL SHIPMENTS

Metal Forming

(in millions of dollars)

Year	Total Shipments		Machines Valued \$2,500* or More		Machines Valued Less Than \$2,500*	
	Units	Value	Units	Value	Units	Value
1982	48,204	\$863.6	18,081	\$839.0	30,123	\$24.7
1983	50,073	580.6	16,111	554.0	33,962	26.6
1984	56,698	738.1	17,774	708.0	38,924	30.1
1985	53,345	804.9	18,683	776.7	34,662	28.2
1986	44,920	798.2	17,912	775.1	27,008	22.1
1987	48,409	887.9	17,579	863.4	30,830	24.5
1988	55,256	1,123.4	20,547	1,096.6	34,709	26.8
1989	46,999	1,100.4	20,892	1,076.3	26,107	24.1
1990(r)	44,459	1,064.8	20,324	1,042.7	24,135	22.1
1991(p)E	35,752	1,030.3	16,134	1,011.1	19,618	19.2

Note: * - \$3,025 in 1991



Constant Dollar Table, Total Shipments

(in millions of 1982 dollars)

Year	Units	Value	Year	Units	Value
1972	59,775	\$1,327.1	1982	48,204	\$863.6
1973	55,443	1,711.7	1983	50,073	565.4
1974	64,988	1,600.9	1984	56,698	705.0
1975	51,172	1,296.3	1985	53,345	752.3
1976	58,118	1,114.2	1986	44,920	734.3
1977	64,566	1,151.5	1987	48,409	805.7
1978	69,813	1,245.3	1988	55,256	992.4
1979	82,199	1,385.8	1989	47,362	919.3
1980	75,336	1,278.9	1990(r)	44,459	800.5
1981	66,666	1,132.2	1991(p)E	35,752	797.0

Source: U.S. Department of Commerce

U.S. MACHINE TOOL SHIPMENTS

Numerically Controlled

(values in millions of dollars)

Year	TOTAL		METAL CUTTING		METAL FORMING	
	Units	Value	Units	Value	Units	Value
1982	D	D	4,962	\$1,067.3	D	D
1983	D	D	4,224	625.3	D	D
1984	D	D	4,921	650.3	D	D
1985	D	D	4,953	717.0	D	D
1986	5,901	\$ 843.5	4,793	735.5	1,108	\$108.0
1987	6,409	931.0	5,291	811.2	1,118	119.8
1988	7,035	991.1	5,662	852.3	1,373	139.6
1989	8,184	1,263.4	6,757	1,090.0	1,427	173.4
1990(r)	7,927	1,375.7	6,307	1,181.8	1,620	193.9
1991(p)	8,212	1,263.2 E	5,796	1,114.7 E	2,416	148.4

Metal Cutting

Year	BORING & DRILLING MACHINES		LATHES		GRINDING & POLISHING MACHINES	
	Units	Value	Units	Value	Units	Value
1982	231	\$110.7	1,489	\$332.8	590	\$49.6
1983	69	37.1	1,202	224.6	494	42.7
1984	119	45.1	1,497	207.8	546	65.9
1985*	89	35.4	1,420	225.2	724	122.4
1986	117	45.9	1,163	188.1	809	144.1
1987*	D	D	1,626	225.6	765	135.7
1988	101	42.0	1,930	239.0	688	105.8
1989	133	58.7	2,226	286.7	802	151.5
1990(r)	149	74.3	2,021	285.5	881	193.1
1991(p)	172	64.7	1,790	267.6	754	175.0 E

Year	MILLING MACHINES		MACHINING CENTERS		OTHER METAL CUTTING MACHINES	
	Units	Value	Units	Value	Units	Value
1982	1,061	\$185.6	1,396	\$357.6	140	\$31.0
1983	1,091	108.9	1,005	182.9	363	29.1
1984	1,434	108.9	1,237	213.2	88	9.4
1985	1,087	99.6	1,077	214.7	556	19.7
1986	1,282	114.2	936	213.4	486	29.8
1987	818	113.2	1,361	217.8	721	118.9
1988	654	84.3	1,770	314.2	254	46.7
1989	769	109.2	2,557	442.2	270	41.7
1990(r)	684	153.8	2,291	424.1	281	51.0
1991(p)	606	181.2	2,225	379.7	249	46.5

Metal Forming

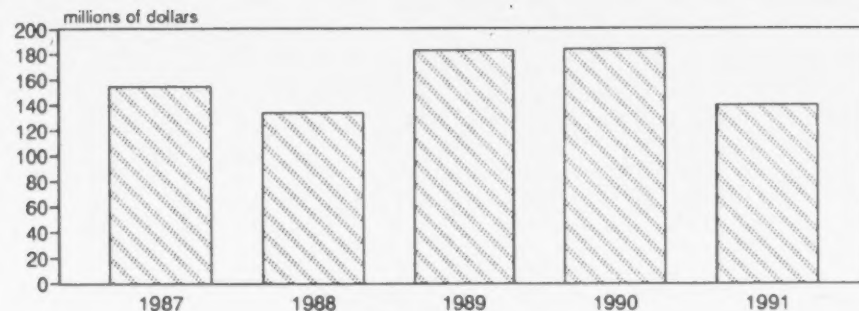
Year	PUNCHING, SHEARING, BENDING & FORMING		OTHER METAL FORMING MACHINES	
	Units	Value	Units	Value
1982	1,104	\$ 59.3	D	D
1983	557	51.9	D	D
1984	660	89.2	D	D
1985	565	75.0	D	D
1986	537	72.3	571	\$35.7
1987	527	87.7	591	32.1
1988	738	107.6	635	32.0
1989	907	125.3	520	48.1
1990(r)	1,024	140.1	596	53.8
1991(p)	773	113.7	1,643	34.7

Source: U.S. Department of Commerce

Note: "Drilling Machines" are included in the "Other Metal Cutting Machines" category.

U.S. MACHINE TOOL SHIPMENTS

Boring and Drilling Machines



(values in millions of U.S. dollars)

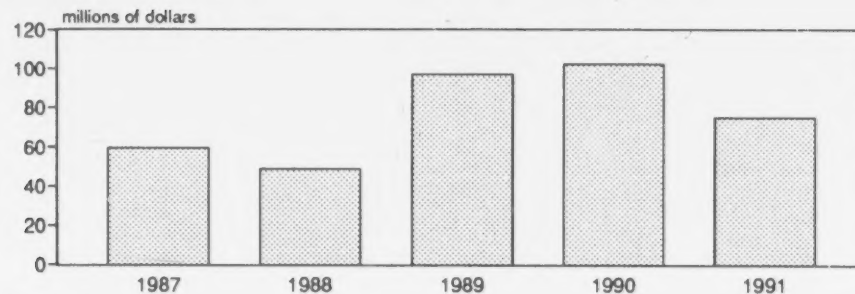
	UNITS					VALUE				
	1987	1988	1989	1990(r)	1991(p)	1987	1988(r)	1989	1990(r)	1991(p)
Boring and Drilling Machines	7,708	10,236	10,508	8,828	7,984	\$154.7	\$133.9	\$183.2	\$184.1	\$139.8
Boring Machines valued under \$3,025	—	—	—	—	D	—	—	—	—	D
Horiz. Boring, Drilling & Milling Mchs.:										
Table Type	29	D	57	45	75	18.8	D	26.6	26.5	34.3
Floor Type										
Precision Boring Machines	474	422	524	546	466	84.3	68.6	89.8	92.0	62.6
Jig Boring Machines	15	D	D	D	D	3.8	D	D	D	D
All Other Boring Machines	—	—	—	D	D	—	—	—	D	D
Drilling Mchs. valued under \$3,025	5,865	7,877	7,376	6,811	5,147	9.5	8.6	9.0	8.8	6.5
Vertical Upright Drilling Machines	326	713	957	754	1,405	3.2	3.9	5.2	4.3	4.8
Radial Drilling Machines				D	D				D	D
Deep Hole Drilling Machines	123	D	99	104	48	9.7	D	12.9	16.3	7.0
Multiple Spindle Drilling Machines:										
Adjustable Joint and Fixed Center	650	661	876	126	90	18.7	14.4	16.9	5.5	3.3
All Other Automatic Multiple Spindle		105	173	157	211		6.4	7.2	8.6	12.0
All Other Drilling Machines, n.e.c.	129	D	D	251	175	6.7	D	D	14.9	3.8

Source: U.S. Department of Commerce

Note: r - revised, p - preliminary, D - not disclosed, n.e.c. - not elsewhere classified

U.S. MACHINE TOOL SHIPMENTS

Gear Cutting Machines



(values in millions of U.S. dollars)

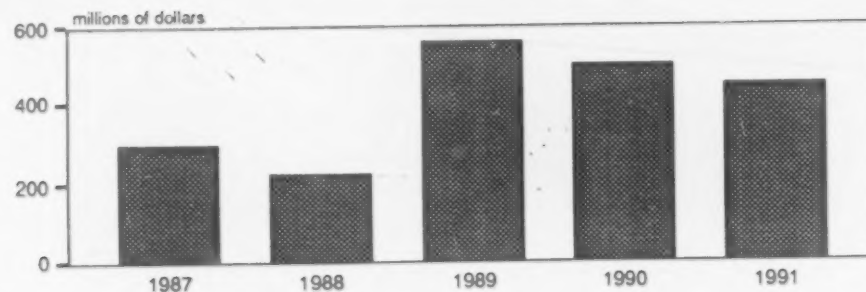
	UNITS					VALUE				
	1987	1988	1989	1990(r)	1991(p)	1987	1988(r)	1989	1990(r)	1991(p)
Gear Cutting Machines	204	164	249	233	330	\$59.6	\$48.9	\$97.3	\$102.7	\$115.2
Gear Tooth Finishing Machines ¹	204	164	249	233	330	59.6	48.9	97.3	102.7	115.2
Gear Hobbers—Horiz. and Vertical ²										

Source: U.S. Department of Commerce

Note: ¹Includes bevel gear generators, ²Includes gear shapers, r – revised, p – preliminary

U.S. MACHINE TOOL SHIPMENTS

Station-type Machines



(values in millions of U.S. dollars)

	UNITS					VALUE				
	1987	1988	1989	1990(r)	1991(p)	1987	1988(r)	1989	1990(r)	1991(p)
Station-type Machines	434	283	508	416	336	\$299.6	\$225.4	\$562.9	\$502.1	\$450.4
Dial or rotary, trunnion, & cen. column	} 287	188	274	} 416	} 236	} 125.3	85.3	152.7	} 502.1	} 188.9
Way type										
Transfer										
Other Station-type	94	63	} 234	} 100	} 100	144.6	128.4	} 410.2	} 261.6	} 261.6
	53	32								

Source: U.S. Department of Commerce

Note: r - revised, p - preliminary

U.S. MACHINE TOOL SHIPMENTS

Grinding and Polishing Machines

(values in millions of U.S. dollars)

	UNITS					VALUE				
	1987	1988	1989	1990(r)	1991(p)	1987	1988	1989	1990(r)	1991(p)
All Grinding and Polishing Machines	59,897	63,283	60,157	58,276	49,754	\$384.7	\$358.7	\$419.8	\$433.6	\$489.4
Unit Value Under \$3,025	52,683	55,176	52,465	51,844	43,488	13.1	15.1	15.9	14.0	13.0
Unit Value \$3,025 and Over	7,214	7,938	7,692	6,432	6,266	371.6	343.6	403.9	419.6	476.4
External Cylindrical Grinding Machines:										
Plain	78	85	76	86	84	20.1	21.2	25.8	31.2	34.9
Universal	103	119	58	47	33	6.6	8.8	7.2	8.5	5.2
Roll grinders										
Centerless										
Chucking	575	495	504	408	561	76.1	53.2	60.5	80.3	70.6
All Other External (a)										
Internal Cylindrical Grinding Machines	D	D	D	D	86	D	D	D	D	32.0
Surface Grinding Machines:										
Rotary Table Type	71	65	280	274	255	16.6	13.0	22.7	21.0	17.3
Reciprocating Table Type:										
Vertical and Horizontal	421	686	605	515	328	13.3	20.6	21.1	20.9	12.2
Hand Surface Type	878	811	778	650	445	8.9	6.5	4.7	5.2	3.0
All other surface grinding machines	D	D	D	D	D	D	D	D	D	D
Disc Grinders, Double Spindle	D	D	D	D	D	D	D	D	D	D
All other Disc Grinders, bench, floor, snag grinders and abrasive belt grinders	320	265	260	208	267	12.1	7.5	7.6	6.3	13.8
Tool and Cutter Grinding Machines	782	981	1,001	678	513	43.5	57.7	70.1	45.7	54.4
All other grinding machines	980	1,116	990	767	1,379	28.7	43.0	40.8	34.8	72.7
Honing and Lapping Machines, internal, including combination bore, hone, and external	1,129	D	1,306	1,140	803	39.6	D	36.8	38.5	34.6
Flat surface lapping, except gear lapping	187	230	220	404	334	8.6	12.4	5.7	21.1	21.0
All other honing and lapping	D	D	D	D	D	D	D	D	D	D
Polishing stands, abrasive belt drum and disc	333	D	D	D	D	6.0	D	D	D	D
All other polishing and buffing machines, including speed lathes and multistation type	1,061	1,212	1,163	762	759	24.0	25.0	33.5	25.2	29.2

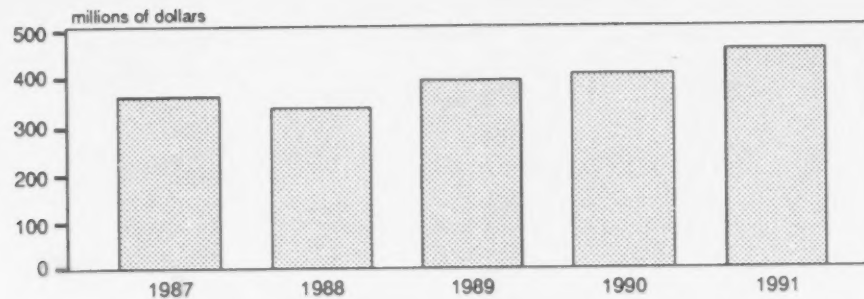
Source: U.S. Department of Commerce

Note: (a) - Includes chucking grinders, r - revised, p - preliminary, D - not disclosed, E - estimated by AMT

See graph next page

U.S. MACHINE TOOL SHIPMENTS

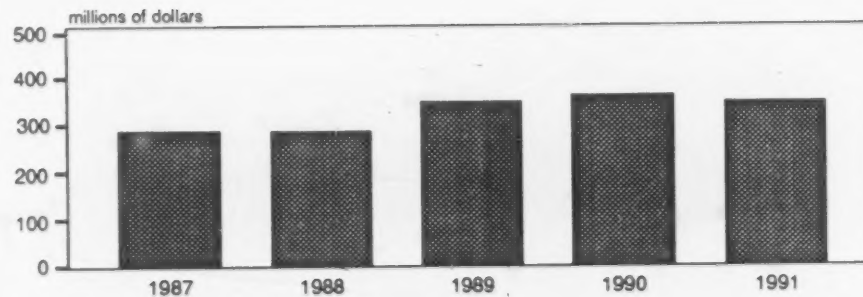
Grinding and Polishing Machines



See data table previous page.

U.S. MACHINE TOOL SHIPMENTS

Lathes



See data table next page.

U.S. MACHINE TOOL SHIPMENTS

Lathes

(values in millions of U.S. dollars)

	UNITS					VALUE				
	1987	1988	1989	1990(r)	1991(p)	1987	1988	1989	1990(r)	1991(p)
Lathes (or Turning Machines)	3,045	3,317	3,789	3,247	2,753	\$283.5	\$282.5	\$343.2	\$355.6	\$341.0
Horizontal NC Turning Machines	1,530	1,836	2,130	1,973	1,695	183.1	194.4	234.5	242.9	203.9
Multiple Spindle	—	—	—	(a)	(a)	—	—	—	(a)	(a)
Single Spindle:										
Small	1,352	1,687	1,785	1,584	1,421	120.0	152.1	153.5	144.2	133.8
Medium	96	100	302	298	202	24.1	17.7	68.8	64.3	40.9
Large	82	49	43	91	72	38.9	24.6	12.2	34.3	29.3
Vertical NC Turning Machines	96	94	96	105	95	42.6	45.5	52.2	63.7	63.1
Vertical turret lathe and vertical boring machine over 30" diameter table	} 96	94	96	105	95	42.6	45.5	52.2	63.7	63.1
Vertical multiple spindle machines										
All other vertical turning machines										
Non-Numerically Controlled Turning Machines	1,419	1,387	1,563	1,169	963	57.9	43.5	56.6	49.1	74.0
All lathes valued at under \$3,025	D	—	—	D	—	D	D	D	D	—
Engine or toolroom lathes swing over cross slide:										
8" or less										
8"-16"	} 592	539	589	454	392	} 12.0	10.4	14.7	13.2	15.6
Over 16"										
All other engine or toolroom lathes										
Automatic Lathes:										
Single Spindle	D	D	51	55	D	D	D	3.4	2.2	D
Multiple Spindle:										
Bar (screw) machines	D	D	267	177	D	D	D	24.2	22.5	D
Chucking machines	D	D	D	D	D	D	D	D	D	D
All other horizontal turning machines	D	D	D	309	D	D	D	D	6.4	D
Vertical turret lathes and vertical boring machines	D	D	D	D	D	D	D	D	D	D
All other vertical turning machines	D	D	D	D	D	D	D	D	D	D

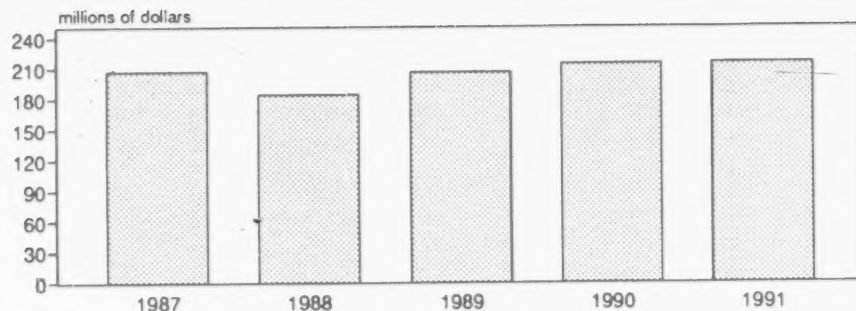
Source: U.S. Department of Commerce

Note: (a) - included in large single spindle to avoid disclosure, r - revised, p - preliminary, D - not disclosed

See graph previous page.

U.S. MACHINE TOOL SHIPMENTS

Milling



(values in millions of U.S. dollars)

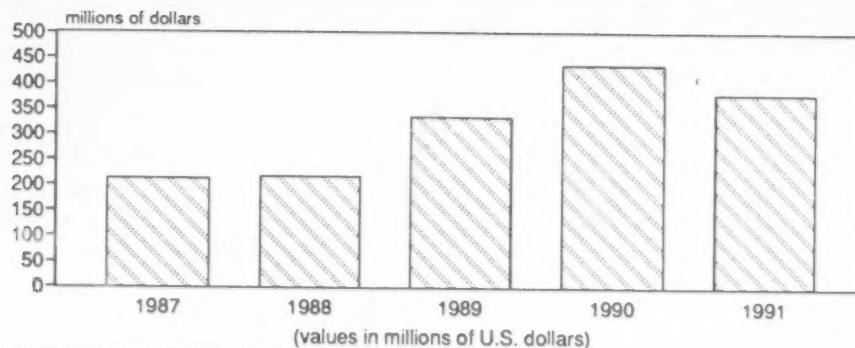
	UNITS					VALUE				
	1987	1988	1989	1990(r)	1991(p)	1987	1988	1989	1990(r)	1991(p)
Milling Machines	6,277	7,717	6,872	4,787	3,827	\$206.9	\$184.5	\$206.2	\$214.3	\$215.2
Milling Machines valued under \$3,025	688	450	800	333 E	566 E	1.0 E	0.7	1.2	0.8 E	1.0 E
Milling Machines valued over \$3,025	5,589	7,267	6,072	4,454 E	3,261 E	206.0 E	183.8	205.0	213.5 E	214.2 E
General Purpose, Knee or Bed:										
Horizontal, Plain, Universal, and Ram										
Vertical, except Ram	}	D	D	D	D	D	D	D	D	D
Vertical Ram										
All Other General Purpose Milling Machines										
Automatic and manufacturing:										
Single spindle	D	D	D	D	D	D	D	D	D	D
Multiple spindle and special purpose machines	437	D	D	D	D	19.6	D	D	D	D
Profile machines and duplicators	}	175	162	149	81	132.2	87.3	81.1	78.9	148.6
Die Sinking and engraving machines					-				-	
All Other Milling Machines					40				49.4	

Source: U.S. Department of Commerce

Note: p - preliminary, r - revised, E - estimated by AMT, D - not disclosed

U.S. MACHINE TOOL SHIPMENTS

Machining Centers



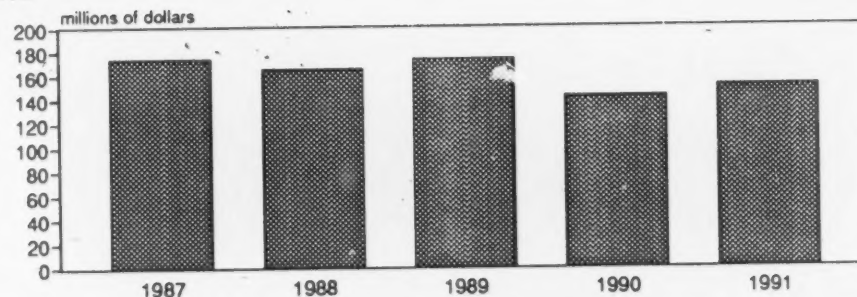
	UNITS					VALUE				
	1987	1988	1989	1990(r)	1991(p)	1987	1988	1989	1990(r)	1991(p)
Machining Centers	1,361	2,035	2,557	2,327	2,225	\$213.4	\$217.8	\$334.5	\$437.0	\$379.7
Drill, Mill, and Bore (Manual Tool Change):										
Vertical	D	D	D	D	D	D	D	D	D	D
Horizontal	D	D	D	D	D	D	D	D	D	D
Drill, Mill, and Bore (Automatic Tool Change):										
Vertical:										
Y-axis Travel Less Than 20 Inches	272	552	603	592	540	22.7	46.6	52.7	49.4	41.9
Y-axis Travel 20 Inches to 26 Inches	329	761	931	821	729	37.2	77.0	96.8	85.5	70.5
Y-axis Travel Over 26 Inches	95	212	278	298	243	15.2	18.5	37.6	56.0	42.3
Horizontal:										
Y-axis Travel Less Than 27 Inches	D	D	307	274	187	D	D	85.2	82.6	56.1
Y-axis Travel 27 Inches to 40 Inches	D	D	157	119	103	D	D	57.6	42.4	37.7
Y-axis Travel Over 40 Inches	84	73	103	113	101	57.9	53.1	76.1	93.9	97.4
Machining Centers with automatic multiple spindle head changing capability	D	D	D	D	D	D	D	D	D	D
All other machining centers	D	D	D	D	D	D	D	D	D	D

Source: U.S. Department of Commerce

Note: r - revised, p - preliminary, D - not disclosed

U.S. MACHINE TOOL SHIPMENTS

Other Metal Cutting

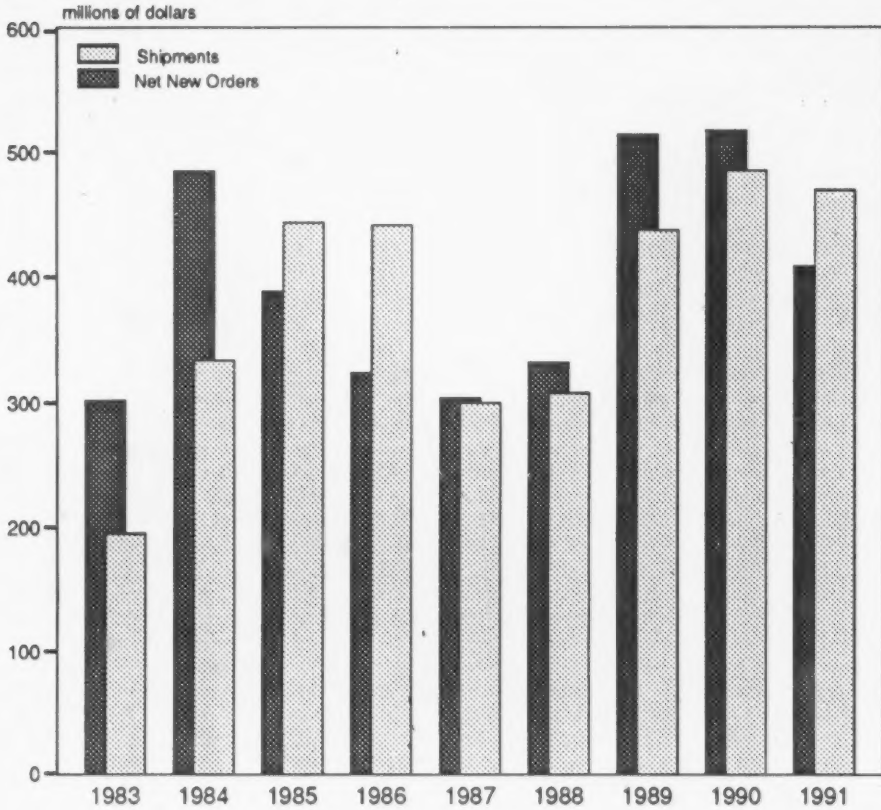


(values in millions of U.S. dollars)

	UNITS					VALUE				
	1987	1988	1989	1990(r)	1991(p)	1987	1988	1989	1990(r)	1991(p)
Other Metal Cutting Machine Tools	13,785	17,741	18,936	14,709	12,466	\$173.9	\$165.4	\$173.7	\$141.9	\$151.0
Other Metal Cutting valued under \$3,025	8,020	10,828	11,359	7,857	6,881	8.5	11.8	11.4	8.3	6.5
Other Metal Cutting valued over \$3,025	5,765	6,913	7,577	6,852	5,585	165.4	153.6	162.3	133.6	144.5
Broaching Machines	94	63	89	63	185	11.1	7.8	10.3	6.6	12.4
Sawing and Cutoff Machines:										
Power Hack Saws	104	84	61	62	D	1.3	1.0	1.0	1.4	D
Circular Cutoff Saws (Cold)	D	D	232	122	D	D	D	13.8	4.7	D
Abrasive Wheel Saws	D	D	D	D	D	D	D	D	D	D
Band Saws	2,904	3,862	4,542	4,261	2,792	26.1	35.3	43.0	41.7	31.7
All other sawing and cutoff machines	558	617	658	667	666	15.3	20.9	18.9	18.5	24.6
Tapping Machines	D	D	D	D	40	D	D	D	D	1.3
Spark Erosion, ultrasonic, and electrolytic machines:										
Electrical Discharge Machines				442					21.6	
Traveling Wire EDM				24					1.2	
Electrochemical Machines	} 660	626	652	5	} 503	} 24.8	26.3	30.4	1.1	} 22.2
All other spark erosion, ultrasonic and electrolytic machines				112					2.4	
Miscellaneous Metal Cutting Machine Tools				988	1,073	25.2	43.0	36.0	28.9	39.2

Source: U.S. Department of Commerce

Note: r - revised, p - preliminary, D - not disclosed



B

(in millions of dollars)

Year	Shipments	Net New Orders
1983	\$194	\$301
1984	333	484
1985	443	388
1986	441	323
1987	299	303
1988	307	331
1989	437	514
1990	485	517
1991	469	408

Source: Robotics Industries Association

U.S. MACHINE TOOL SHIPMENTS

Punching, Shearing, Bending and Forming

(values in millions of U.S. dollars)

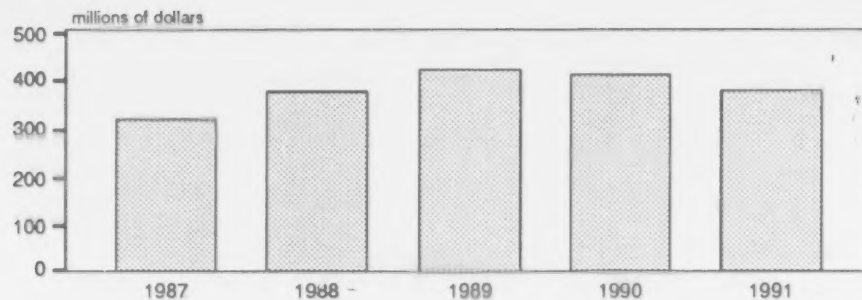
	UNITS					VALUE				
	1987	1988	1989	1990(r)	1991(p)	1987	1988	1989	1990(r)	1991(p)
Punching, Shearing, Bending, and Forming	25,274	25,830	21,816	21,704	17,325	\$315.3	\$372.3	\$418.0	\$407.5	\$374.8
Punching and Shearing:										
Valued less than \$3,025	3,287	4,292	3,701	3,363	2,583	4.3	5.0	4.7	4.2	3.3
Punches, including combination punching and shearing	1,684	1,985	1,864	2,448	2,460	16.8	21.6	28.3	37.0	33.5
Punching machines fixed position and two axis positioning table	394	507	520	497	388	61.7	75.9	83.3	77.5	57.8
Plate Shearing Machines:										
Mechanical	344	422	532	377	258	31.4	33.8	46.7	45.2	54.2
Hydraulic	771	877	981	1,118	735	13.9	13.9	17.8	21.2	15.0
Bar, angle, and rotary shearing machines	118	106	90	91	} 333	2.5	1.1	1.6	1.2	} 24.6
Other power operated punching & shearing mach.	207	256	263	244		11.4	16.0	17.7	13.8	
Bending and Forming valued less than \$3,025	11,534	10,591	7,222	7,001	5,260	10.8	8.9	6.8	6.8	5.7
Press Brakes:										
Mechanical	74	122	D	D	D	3.3	3.8	D	D	D
Hydraulic	657	842	787	842	562	30.9	43.2	47.3	54.3	35.6
Hydromechanical	134	D	D	D	D	3.9	D	D	D	D
Bending rolls, sheet, and plate	360	D	D	601	477	6.4	21.7	25.6	18.6	17.9
Bending rolls, angles, bars, shapes and tubes	D	D	139	193	155	D	D	10.7	16.9	17.2
Rotary bending and forming machines, including rotary head	2,229	2,239	2,062	2,033	1,631	26.1	27.4	26.9	27.9	23.9
Ram and press bending machines	D	D	415	375	345	D	D	9.6	8.9	8.9
Other bending and forming machines, incl. folders	2,984	2,523	2,595	2,326	1,741	67.6	70.1	84.5	89.6	75.6

Source: U.S. Department of Commerce

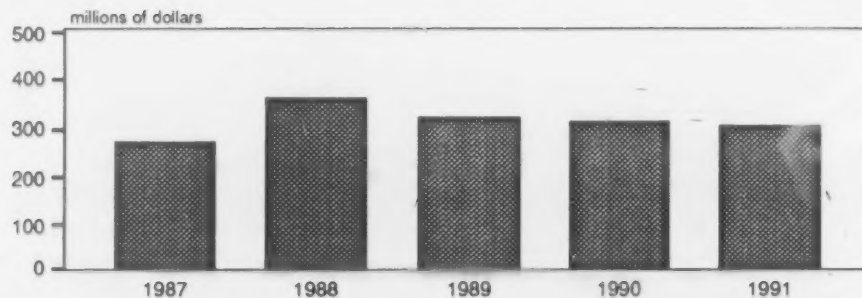
Note: r - revised, p - preliminary, D - not disclosed

See graph next page.

U.S. MACHINE TOOL SHIPMENTS

Punching, Shearing, Bending and Forming*See data table previous page.*

U.S. MACHINE TOOL SHIPMENTS

Presses*See data table next page.*

U.S. MACHINE TOOL SHIPMENTS

Presses

(values in millions of U.S. dollars)

	UNITS					VALUE				
	1987	1988	1989	1990(r)	1990(p)	1987	1988	1989(p)	1990(r)	1990(p)
Presses	8,134	9,593	8,959	7,285	5,912	\$265.6	\$356.5	\$316.5	\$308.3	\$299.0
All presses valued under \$3,025	5,585	6,572	5,520	4,231	3,763	4.0	5.3	3.4	3.5	3.5
Mechanical presses:										
Open back inclinable, gap type:										
50 tons and under	423	449	483	659	293	4.7	6.6	7.6	7.8	4.4
51 tons to 120 tons	151	194	214	183	131	7.3	11.6	12.5	10.1	7.9
121 tons and over	59	14	D	D	D	2.8	1.0	D	D	D
Vertical straight side and arch frame single action:										
Single point	D	D	D	D	D	D	D	D	D	D
Two point 300 tons and under	} 61	68	91	79	73	} 15.0	13.1	19.3	16.8	12.8
Two point 301 tons and over		41	58	37	D		18.5	36.3	20.9	D
Gap and horn type	36	D	D	D	D	4.0	D	D	D	D
Automatic presses, strip or coil feed	331	409	438	634	283	52.0	56.9	72.7	64.8	41.9
All other mechanical presses	62	176	D	D	65	76.7	174.6	D	D	96.5
Hydraulic and Pneumatic Presses										
Vertical Single Action, all tonnages:										
Housing or Straight Side Type	14	30	10	31	D	4.3	7.4	4.5	17.9	D
Column and Open Rod Type	113	84	D	D	100	10.8	10.4	D	D	25.3
Gap or C-Frame:										
15 Tons and Under	472	571	469	417	388	3.7	5.5	3.8	3.5	4.1
16-35 Tons	D	65	55	67	65	D	2.4	2.3	2.7	2.4
Over 35 Tons	D	59	66	65	37	D	6.9	6.2	9.6	7.0
Vertical double action 2-slide type, all tonnages	D	D	D	D	D	D	D	D	D	D
Extrusion Presses, all types	D	D	D	D	D	D	D	D	D	D
Other hydraulic and pneumatic presses, including horizontal	594	782	1,135	863	600	24.0	21.8	24.5	30.7	29.9

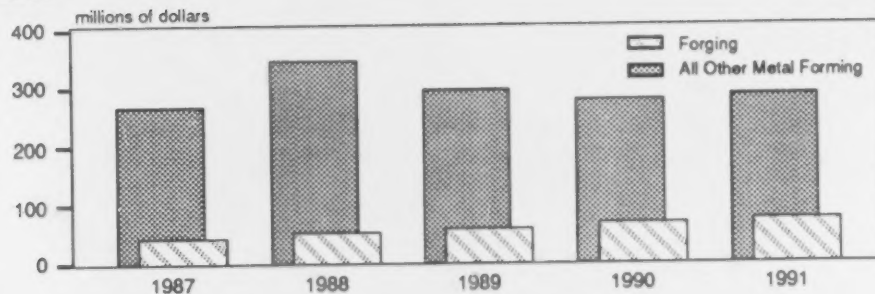
Source: U.S. Department of Commerce

Note: r - revised, p - preliminary, D - not disclosed

See graph previous page.

U.S. MACHINE TOOL SHIPMENTS

Forging and Other Metal Forming



(values in millions of U.S. dollars)

	UNITS					VALUE				
	1987	1988	1989	1990(r)	1991(p)	1987	1988	1989	1990(r)	1991(p)
Forging Machines	184	225 E	227 E	231	152 E	\$42.7	\$52.5 E	\$58.5 E	\$73.9	\$73.0 E
Headers and upsetters										
Swaging Machines										
Forging presses (die stamping presses)	184	225 E	227 E	231	152 E	42.7	52.5 E	58.5 E	73.9 E	73.0 E
All other forging machines										
All other metal forming machine tools	14,817	19,608	16,359	15,239	12,363	264.2	342.1	292.7	275.0	283.5
All other metal forming machine tools valued at less than \$3,025	10,424	13,254	10,371	9,540	7,596	5.6	7.6	8.4	7.6	6.8
Thread rolling machinery	297	400	322	230	360	9.7	9.7	16.2	10.0	22.6
Metal container-making machinery	1,300	1,569	1,825	518	541	140.0	168.4	141.7	100.2	120.0
Die casting machines:										
200 tons and under										
201 tons to 500 tons	180	185	136	96	56	49.5	58.0	43.8	53.2	28.0
501 tons to 700 tons										
701 tons and over										
Riveting machines	1,096	2,193	1,340	2,378	2,125	15.3	24.0	20.3	34.8	25.0
All other metal forming type machine tools, n.e.c.	1,520	2,007	2,365	2,477	1,685	44.1	74.4	62.3	69.1	81.1

Source: U.S. Department of Commerce

Note: n.e.c. - not elsewhere classified, r - revised, p - preliminary, E - estimated by AMT, D - not disclosed

U.S. MACHINE TOOL SHIPMENTS

(values in millions of U.S. dollars)

Metal Cutting Historical Series

Year	TOTAL	Boring Machines	Drilling Machines	Gear Cutting and Finishing	Grinding and Polishing	Lathes	Milling Machines	Machining Centers	Station Type Machines	Other Metal Cutting Machines
1961	\$ 531.3	\$ 51.5	\$ 36.8	\$ 36.4	\$121.0	\$126.5	\$ 73.7	D	D	\$ 85.4
1962	626.8	61.4	53.2	35.8	127.9	152.3	95.8	D	D	100.4
1963	657.6	67.9	52.0	39.5	136.8	154.8	106.1	D	\$ 43.6	56.9
1964	874.5	74.1	72.3	47.1	175.9	198.1	125.8	D	95.5	85.7
1965	1,047.8	91.9	83.2	55.7	213.6	234.8	144.0	D	132.7	92.0
1966	1,231.9	110.9	105.9	59.0	235.9	286.5	201.7	D	120.1	111.9
1967	1,373.2	117.8	122.8	63.9	247.8	334.0	234.3	D	131.7	120.9
1968	1,309.4	93.7	67.7	68.2	235.1	316.2	234.1	\$ 91.1	104.6	98.7
1969	1,242.6	80.2	67.5	65.6	227.3	288.9	184.6	84.4	140.9	103.2
1970	1,097.7	62.1	70.9	66.3	219.4	240.1	110.0	68.8	167.4	92.8
1971	714.5	35.8	43.4	50.1	142.9	174.9	54.4	38.8 E	97.2	76.7
1972	858.0	54.1	65.8	50.3	151.0	203.2	81.7	D	132.6	119.3
1973	1,224.7	66.7	90.5	55.4	209.6	299.0	104.6	115.0	190.7	93.2
1974	1,525.6	81.4	77.9	66.2	249.9	370.2	137.7	163.1	258.5	120.7
1975	1,790.4	83.9	92.9	65.1	273.2	464.2	134.0	196.7	354.6	125.8
1976	1,592.2	77.8	100.4	56.0	246.8	430.3	134.4	178.4	223.0	145.2
1977	1,791.3	84.9	107.2	61.4	273.1	436.3	160.2	175.1	318.9	174.1
1978	2,334.4	117.7	152.4	102.7	348.6	535.9	194.3	246.0	322.5	314.4
1979	3,037.2	177.4	150.5	111.2	474.9	650.3	279.8	356.5	607.6	229.0
1980	3,716.4	192.0	166.9	130.3	555.8	827.0	339.3	413.0	813.5	278.6
1981	4,046.9	231.0	140.0	133.1	615.4	816.8	436.6	482.7	896.1	295.4
1982	2,940.6	193.8	65.9	86.5	486.7	507.3	265.6	357.6	731.1	246.2
1983	1,564.2	95.8	41.1	35.8	280.8	320.9	146.5	182.9	274.0	186.4
1984	1,688.3	96.1	37.2	40.0	335.6	307.6	179.9	213.2	311.9	166.8
1985	1,877.3	85.1	43.8	51.8	415.0	318.7	180.6	214.7	406.1	161.5
1986	1,911.6	83.9	40.0	57.3	419.7	262.0	169.2	213.4	517.7	148.4
1987	1,780.7	154.7		59.6	384.7	283.5	206.9	217.8	299.6	173.9
1988	1,734.8	133.9		48.9	359.8	282.5	184.5	334.5	225.4	165.4
1989	2,428.5	183.2		97.3	419.8	343.2	206.2	442.2	562.9	173.7
1990(r)	2,371.3	184.1		102.7	433.6	355.6	214.3	437.0	502.1	141.9
1991(p)	2,281.8	139.8		115.2	489.4	341.0	215.2	379.7	450.4	151.0

Source: U.S. Department of Commerce

Note: p - preliminary, r - revised, E - estimated by AMT, D - not disclosed

U.S. MACHINE TOOL SHIPMENTS

Metal Forming Historical Series

(values in millions of U.S. dollars)

Year	TOTAL	Presses	Forging Machines	Punching and Shearing Machines	Bending and Forming Machines	Other Metal Forming Machines
1961	\$ 233.1	\$111.3	\$15.8	\$ 33.3	\$ 32.5	\$ 40.2
1962	240.4	109.5	23.7	34.5	29.0	43.7
1963	309.5	136.0	22.3	42.8	45.2	63.2
1964	334.6	169.5	23.1	33.2	42.7	66.1
1965	409.9	209.2	32.8	43.9	49.4	74.6
1966	480.9	253.3	32.7	49.7	51.0	94.2
1967	496.1	240.1	29.6	56.9	57.4	112.1
1968	413.4	199.1	31.9	57.1	64.4	60.9
1969	449.6	223.7	32.0	53.6	66.0	74.3
1970	454.1	239.6	36.6	47.7	59.8	70.4
1971	343.4	166.5	37.0	41.4	53.3	45.2
1972	411.3	166.7	34.5	62.5	67.9	79.8
1973	563.1	242.7	38.7	75.8	94.5	111.4
1974	640.4	307.0	40.1	86.1	113.0	94.2
1975	615.7	269.4	39.5	121.0	115.4	70.4
1976	586.0	223.6	52.2	120.0	118.8	71.4
1977	662.1	260.7	55.1	130.6	137.2	78.5
1978	808.2	350.9	59.3	146.6	147.7	103.7
1979	1,026.8	434.0	84.7	181.2	183.4	143.5
1980	1,096.0	440.8	73.8	204.2	214.9	162.3
1981	1,064.3	429.6	79.0	206.1	212.8	136.7
1982	863.6	344.8	79.0	142.2	166.5	131.1
1983	580.6	160.8	48.0	120.1	138.6	113.1
1984	738.1	230.1	29.0	139.2	177.9	161.9
1985	804.9	254.0	35.4	144.0	178.4	193.1
1986	798.2	293.1	36.7	122.3	169.9	176.2
1987	887.9	265.6	42.7	142.0	173.4	264.2
1988	1,123.4	356.5	52.5	167.3	204.9	342.1
1989	1,085.7	316.5	58.5	200.1	217.9	292.7
1990(r)	1,064.8	308.3	73.9	186.3	221.3	275.0
1991(p)	1,030.3	299.0	73.0E	188.3	186.5	283.5

Source: U.S. Department of Commerce

Note: p - preliminary, r - revised, E - estimated by AMT

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U.S. Foreign Trade in Machine Tools and Other Manufacturing Technology

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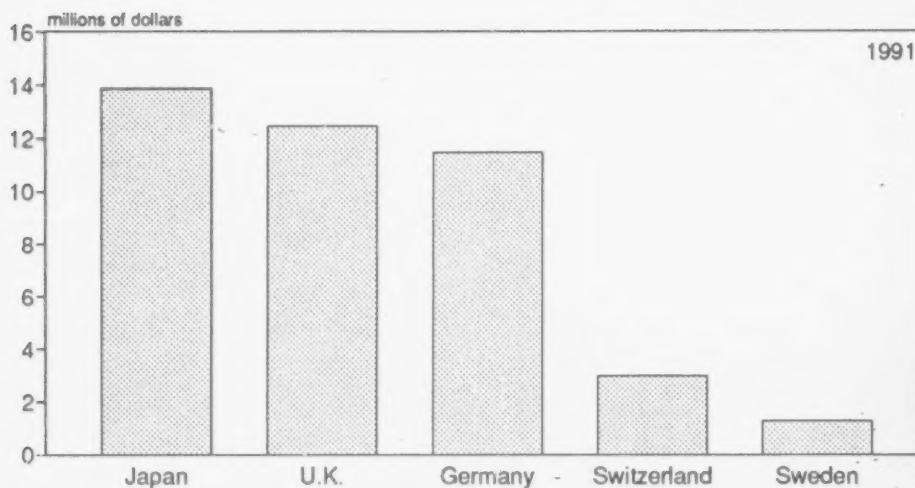
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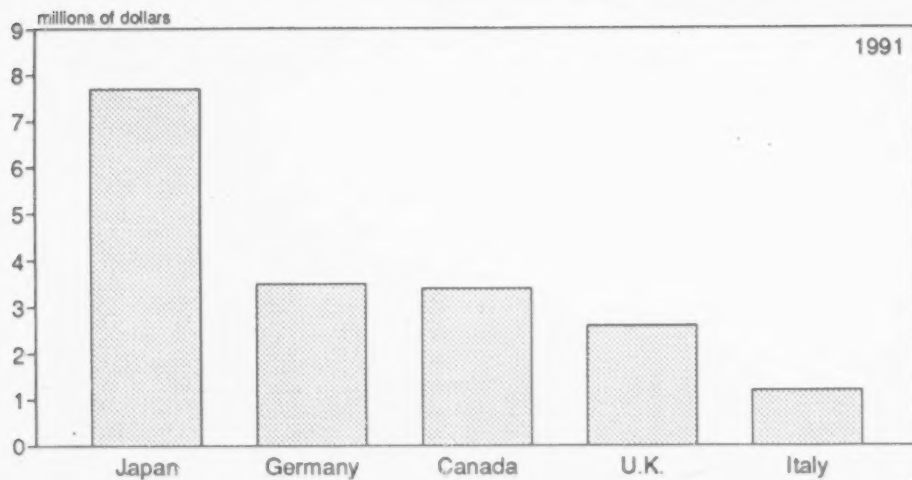


(in millions of dollars)

Country of Origin	1987	1988	1989	1990	1991
WORLD TOTAL	\$19.8	\$21.0	\$38.6	\$33.7	\$49.3
Japan	3.2	8.4	13.0	10.8	13.9
United Kingdom	2.6	2.9	7.0	9.5	12.5
Germany	5.3	4.1	9.1	6.0	11.5
Switzerland	1.6	1.0	0.9	1.5	3.0
Sweden	0.2	0.1	1.1	0.6	1.3
Canada	0.9	1.2	1.5	1.3	1.1
Italy	1.8	0.8	0.6	0.3	0.9
France	0.3	0.1	0.1	0.4	0.7
Taiwan	2.4	0.6	1.0	0.5	0.6
Singapore	(a)	(a)	0.0	0.0	0.4

Source: U.S. Department of Commerce

Note: (a) - less than 50,000



(in millions of dollars)

Country of Origin	1987	1988	1989	1990	1991
WORLD TOTAL	\$6.7	\$5.7	\$17.5	\$25.3	\$24.0
Japan	2.7	1.1	3.3	5.3	7.7
Germany	0.9	0.6	3.1	4.8	3.5
Canada	1.3	2.2	2.4	4.6	3.4
United Kingdom	0.5	0.4	2.1	1.6	2.6
Italy	0.5	(a)	1.4	4.1	1.2
Brazil	(a)	0.0	0.0	0.2	1.0
Belgium	(a)	0.2	1.7	1.8	0.9
Switzerland	0.7	0.2	0.8	0.9	0.9
France	(a)	0.1	0.2	1.9	0.2
Sweden	0.2	0.1	0.5	1.0	0.2

Source: U.S. Department of Commerce

Note: (a)— Less than \$50,000

U.S. MACHINE TOOL IMPORTS

Metal Cutting by Machine Classification

(values in thousands of dollars)

Machine Classification	1990		1991	
	Units	Value	Units	Value
MACHINE TOOL TOTAL	1,019,431	\$2,305,077	968,366	\$2,135,671
of which NC	11,278	1,194,421	9,589	1,099,849
METAL CUTTING TOTAL	986,490	1,766,629	942,092	1,645,056
of which NC	10,302	1,086,639	8,814	1,015,003
Electro-discharge machines	1,648	92,260	1,238	78,842
Traveling wire EDM	847	60,639	719	56,119
Other NC EDM	337	20,834	225	18,553
Other non-NC EDM	464	10,787	294	4,170
Machining centers	3,021	399,902	2,636	312,617
Vertical, Y-axis travel	2,174	191,865	1,938	169,533
Not over 660mm (26")	2,027	165,264	1,817	150,922
Over 660mm (26")	147	26,601	121	18,611
Horizontal	623	141,574	482	107,222
Other	224	66,463	216	35,862
Station type machines	172	82,841	202	217,879
Unit construction machines	26	3,315	41	9,752
of which NC	24	2,798	34	7,784
Multi-station transfer machines	139	77,598	154	207,089
of which NC	52	38,705	52	80,322
Way-type unit head machines	7	1,928	7	1,038
Lathes	11,504	436,166	7,325	364,228
NC horizontal lathes	2,941	289,649	2,461	253,757
Multiple spindle	280	49,572	282	45,024
Single spindle, power rating	2,661	240,077	2,179	208,733
Under 18.65 kW (25 HP)	2,061	147,846	1,724	130,759
18.65-37.3 kW (25-50 HP)	546	77,476	396	56,599
Over 37.3 kW (50 HP)	54	14,755	59	21,375
Non-NC horizontal lathes	7,148	90,097	4,168	61,147
Engine or toolroom lathes	4,350	44,007	3,362	31,047
Automatic bar and/or chucking machines, single spindle	927	15,939	323	7,782
Automatic bar and/or chucking machines, multiple spindle	136	13,550	50	5,651
Other non-NC horizontal	1,735	16,601	433	16,667
NC vertical lathes	175	27,887	119	31,242
Vertical turret, multiple spindle	22	3,936	28	8,609
Other vertical turret lathes	58	11,750	51	14,351
Other multiple spindle	0	0	14	2,952
Other NC vertical lathes	95	12,201	26	5,330
Non-NC vertical lathes	1,240	28,533	577	18,082
Vertical turret	102	4,481	93	4,579
Other non-NC vertical lathes	1,138	24,052	484	13,503
Drilling machines	1,442	43,700	1,063	40,896
NC drilling	324	22,710	377	25,985
Non-NC drilling	1,118	20,990	686	14,911
Multiple spindle	90	1,985	20	2,017
Radial	487	3,479	268	2,716
Upright, excluding sensitive, turret and deep hole	83	898	45	435
Other non-NC drilling	458	14,628	353	9,743

(continued)

U.S. MACHINE TOOL IMPORTS

Metal Cutting by Machine Classification (continued)

(values in thousands of dollars)

Machine Classification	1990		1991	
	Units	Value	Units	Value
Boring-milling machines	273	\$30,247	206	\$32,456
NC horizontal spindle, table type, excluding planer type	11	2,551	16	6,726
Other NC horizontal spindle	91	14,114	73	13,910
Other NC boring-milling	41	5,292	24	6,113
Non-NC, horizontal spindle	30	2,276	4	271
Other non-NC boring-milling	100	6,014	89	5,436
Boring machines	389	14,300	432	22,233
NC vertical	3	1,471	10	1,326
Other NC boring	28	3,553	25	13,378
Non-NC vertical	70	2,059	40	779
Other non-NC boring	288	7,217	357	6,750
Milling machines	5,312	82,033	3,281	71,503
NC knee type	514	9,369	313	5,921
Non-NC knee type	3,330	23,887	2,086	17,256
Other NC milling	504	24,037	458	34,883
Non-NC profile, duplicating, or die sinking	35	394	36	740
Non-NC bed type	56	3,746	27	765
Other non-NC milling	873	20,600	361	11,938
Threading or tapping machines	362	15,011	435	19,115
of which NC	175	9,537	261	13,397
Grinding or polishing machines	8,426	300,111	5,628	239,510
Surface	3,162	47,866	1,663	32,443
NC	138	14,546	109	13,292
Non-NC reciproc.-table type	1,052	12,074	390	5,432
Other non-NC	1,972	21,246	1,164	13,719
Other grinding machines	2,401	174,225	1,677	134,656
NC	537	97,253	473	83,804
Non-NC external cylindrical, incl. universal	495	19,954	350	13,928
Non-NC internal cylindrical	245	12,373	133	6,426
Other non-NC	1,124	44,645	721	30,498
Tool or cutter grinding	1,018	15,920	734	14,730
of which NC	222	6,340	163	6,928
Honing or lapping machines	265	13,710	256	19,315
of which NC	34	4,576	30	3,622
Other grind, polish, finish, etc.	1,580	48,390	1,298	38,366
of which NC	56	3,748	95	5,557
Planing machines	8	53	9	52
of which NC	0	0	0	0
Shaping or slotting machines	267	10,881	27	400
of which NC	85	3,347	1	85
Broaching machines	92	18,847	19	7,864
of which NC	13	11,534	6	3,026
Gear cutting machines	526	56,796	388	46,886
Gear cutting for bevel gears	0	0	13	1,070
Gear hobbors	119	10,899	148	19,211
Gear shapers	38	13,645	49	6,857
Other gear cutting machines	173	591	130	2,470
Gear grinding or finishing for bevel gears	75	2,585	4	473
Other gear grinding or finishing	121	29,076	44	16,805
Sawing or cutting-off machines	2,051	38,397	1,525	41,448
of which NC	102	6,214	103	11,115
Other metal cutting machines	367	13,951	254	14,943
Used or rebuilt cutting machines	7,713	33,795	3,663	49,343
Cutting machines valued less than \$3,025	942,917	92,336	913,761	84,839

Source: U.S. Department of Commerce

U.S. MACHINE TOOL IMPORTS

Metal Forming
by Machine Classification

(values in thousands of dollars)

Machine Classification	1990		1991	
	Units	Value	Units	Value
METAL FORMING TOTAL	32,941	\$538,448	26,274	\$490,615
of which NC	976	107,781	775	84,846
Die casting machines	376	28,298	242	28,032
Forging or die-stamping machines	988	64,475	764	56,895
Headers or upsetters, including cold headers	161	15,377	71	14,382
Other forge, stamp, or hammers	827	49,098	693	42,513
Bend, fold, straighten, etc.	2,169	93,972	1,708	81,391
NC	530	38,505	520	40,982
Non-NC press brakes	313	9,221	203	7,093
Non-NC bending rolls	93	2,974	58	1,445
Other non-NC	1,233	43,272	927	31,871
Punching or shearing machines	1,643	76,485	992	58,053
Shearing machines	643	21,744	372	16,634
NC shearing	55	5,214	29	3,704
Non-NC shearing	588	16,530	343	12,930
Punching or notching machines, incl. combination punch and shear	1,000	54,741	620	41,419
NC	318	38,986	197	30,248
Non-NC	682	15,755	423	11,171
Presses	3,527	124,007	2,880	141,620
Hydraulic presses	2,480	40,705	2,185	28,339
NC	22	20,256	26	8,462
Non-NC	2,458	20,449	2,159	19,877
Other presses	1,047	83,302	695	113,281
NC	51	4,820	3	1,451
Non-NC mechanical transfer	16	35,884	13	65,212
Other non-NC mechanical	185	5,481	190	17,340
Other non-NC presses	795	37,117	489	29,278
Draw benches for bars, tubes, etc.	159	9,810	133	10,829
Thread rolling machines	91	5,690	66	1,886
Machines for working wire	1,397	71,322	1,222	53,686
Other metal forming machine tools	778	33,316	910	27,780
Used or rebuilt forming machines	1,545	25,307	2,618	23,961
Forming machines valued less than \$3,025	20,268	5,766	14,739	6,485

Source: U.S. Department of Commerce

LEADING SOURCES OF U.S. MACHINE TOOL IMPORTS

All Machine Tools

(values in millions of dollars)

Country	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
WORLD TOTAL	\$1,253.3	\$946.5	\$1,356.6	\$1,738.5	\$2,251.8	\$1,995.4	\$2,058.7	\$2,406.6	\$2,305.1	\$2,135.7
Japan	529.2	414.9	683.3	854.1	1,173.6	1,061.2	1,112.5	1,337.2	1,068.5	991.4
Germany	204.6	125.7	205.7	248.9	367.9	332.0	277.5	338.7	394.1	435.7
Taiwan	90.9	83.4	99.2	134.2	119.3	127.5	135.5	141.5	135.1	111.6
Switzerland	71.8	54.7	78.4	95.2	115.3	103.6	94.9	104.5	121.3	110.4
United Kingdom	107.5	66.4	74.7	93.5	100.7	85.4	105.8	97.5	123.2	91.9
Italy	45.0	49.3	51.3	76.6	129.8	72.4	76.6	79.9	94.7	90.0
Canada	36.6	29.4	40.8	61.2	52.9	49.2	56.6	71.5	89.9	64.8
Brazil	9.3	6.8	5.0	21.5	19.2	7.3	29.6	11.9	12.9	28.1
Sweden	23.4	15.3	19.2	29.0	22.6	23.6	25.8	24.5	49.7	28.1
China	4.0	3.8	2.0	2.6	3.4	3.4	7.6	15.3	23.3	22.5
Spain	20.6	11.6	16.2	19.8	23.1	16.5	22.1	22.6	29.9	21.7
France	12.9	10.5	13.9	19.2	36.9	17.6	17.0	23.8	27.6	21.7
South Korea	18.7	9.8	8.8	9.0	10.9	14.7	14.9	28.3	18.9	19.8
Singapore	11.6	4.4	7.1	15.9	7.3	9.3	12.1	18.8	19.2	14.1
Belgium	9.1	7.1	6.7	10.3	12.7	9.4	18.8	28.2	22.5	11.8
All Others	58.1	53.4	44.9	47.5	56.2	62.3	51.4	62.4	74.3	72.2

Source: U.S. Department of Commerce

LEADING SOURCES OF U.S. MACHINE TOOL IMPORTS

Metal Cutting

(values in millions of dollars)

Country	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
WORLD TOTAL	\$1,057.4	\$716.9	\$1,056.7	\$1,374.7	\$1,654.6	\$1,435.9	\$1,543.3	\$1,859.1	\$1,766.6	\$1,645.1
Japan	467.8	340.0	550.6	721.4	841.8	721.3	839.2	1,042.6	852.6	788.1
Germany	155.0	91.6	137.1	186.7	279.6	268.0	228.1	271.2	313.0	347.3
Taiwan	89.9	82.4	97.3	130.4	116.1	123.0	128.8	132.1	126.2	104.2
Switzerland	61.1	40.5	66.1	76.3	96.6	81.1	76.4	87.0	95.4	87.7
United Kingdom	94.1	56.6	60.8	67.1	77.4	68.7	88.7	80.7	105.0	74.3
Italy	36.5	21.4	38.5	45.3	92.3	45.6	43.0	52.1	55.0	56.2
China	4.0	3.8	1.9	2.5	3.3	3.4	7.4	14.8	22.4	21.6
Canada	22.4	12.7	17.2	30.4	23.3	19.1	19.3	20.8	21.5	20.2
South Korea	18.3	9.8	8.8	8.9	10.8	14.3	14.4	27.7	18.1	19.2
France	9.3	6.6	8.5	12.7	27.3	13.8	12.4	22.0	24.0	19.0
Sweden	14.9	7.7	11.9	15.3	11.0	16.3	10.3	13.6	16.7	17.5
Spain	19.0	9.5	13.6	17.9	19.4	14.2	18.1	19.5	25.5	16.4
Singapore	11.6	4.2	6.7	15.6	6.9	7.5	10.6	17.9	18.7	13.3
Thailand	(a)	(a)	(a)	(a)	(a)	(a)	(a)	0.1	3.7	8.9
Brazil	9.0	6.5	4.3	7.7	4.2	2.3	6.3	7.4	12.7	8.3
All Others	44.5	23.6	33.4	36.5	44.6	37.3	40.3	49.6	56.1	42.8

Source: U.S. Department of Commerce

(a) - less than 50,000

LEADING SOURCES OF U.S. MACHINE TOOL IMPORTS

Metal Forming

(values in millions of dollars)

Country	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
WORLD TOTAL	\$196.0	\$229.5	\$299.9	\$363.8	\$597.2	\$559.5	\$515.4	\$547.6	\$538.4	\$490.6
Japan	61.5	74.9	132.7	132.7	331.8	339.9	273.2	294.5	215.9	203.4
Germany	49.6	34.1	68.6	62.2	88.3	63.9	49.3	67.5	81.0	88.5
Canada	14.2	16.7	23.5	30.8	29.6	30.1	37.4	50.6	68.4	44.7
Italy	8.6	27.9	12.8	31.3	37.5	26.8	33.5	27.8	39.5	33.7
Switzerland	10.7	14.2	12.3	18.9	18.7	22.6	18.5	17.5	25.9	22.7
Brazil	0.4	0.3	0.6	13.9	15.0	4.9	23.3	4.5	0.2	19.8
United Kingdom	13.5	9.8	13.9	26.5	23.3	16.7	17.1	16.8	18.2	17.6
Sweden	8.5	7.6	7.3	13.7	11.6	7.3	15.5	10.9	32.9	10.5
Belgium	3.5	4.1	6.2	6.9	9.8	7.9	15.8	22.7	20.8	10.0
Taiwan	1.0	1.0	1.9	3.9	3.1	4.5	6.7	9.3	8.9	7.4
Finland	(a)	(a)	1.0	(a)	0.8	3.9	1.8	4.8	3.8	6.9
Spain	1.6	2.1	2.6	1.9	3.7	2.3	4.0	3.1	4.4	5.3
Austria	12.8	25.7	3.5	1.3	0.9	7.0	(a)	1.9	0.7	4.2
Netherlands	(a)	3.1	(a)	3.8	2.5	2.7	4.1	2.7	1.1	2.6
France	3.6	3.9	5.4	6.5	9.6	3.8	4.6	1.6	3.7	2.6
All Others	6.5	4.1	7.6	9.5	11.0	15.2	10.6	11.2	13.0	10.8

Source: U.S. Department of Commerce

(a) — less than \$50,000

U.S. MACHINE TOOL IMPORTS

Other Manufacturing Technology by Machine Classification

(values in thousands of dollars)

Machine Classification	1990		1991	
	Units	Value	Units	Value
Machine tool parts and accessories	~	\$564,515	~	\$555,073
Parts for machines to work				
rubber or plastics	~	328,098	~	324,704
Quenching or cutting oils	~	339	~	320
Industrial robots for lifting,				
handling, loading or unloading	2,113	37,810	1,585	33,187
Other industrial robots	14,363	83,416	3,739	134,139
Parts for industrial robots for				
lifting, handling, etc.	~	100,220	~	90,095
Industrial robot parts	~	36,999	~	32,081
Laser, light or photon beam machines	808	44,176	514	59,257
For working metal, NC	167	30,702	178	37,949
For working metal, non-NC	78	4,408	115	11,148
For other materials	563	9,066	221	10,160
Ultrasonic process machines	342	414	103	444
For working metal, NC	0	0	0	0
For working metal, non-NC	13	158	38	151
For working other materials	329	256	65	293
Injection molding machines	3,468	296,732	3,378	299,279
For manufacturing shoes	147	3,389	177	2,287
For rubber or other thermosetting	839	69,739	835	90,109
For thermoplastics	2,482	223,604	2,366	206,883
Extruders	1,190	79,054	560	52,387
For rubber or other thermosetting	217	16,326	186	26,037
For processing thermoplastics	973	62,728	374	26,350
Blow molding machines	339	52,191	270	56,831
Vacuum-molding and other				
thermoforming machines	292	9,921	338	17,296
Machines for molding or				
Retreading pneumatic tires	653	57,022	344	26,583
Otherwise forming inner tubes	271	14,450	89	5,847
Otherwise forming other	1,034	50,598	687	34,087
Other machines for working				
rubber or plastics	15,508	121,293	2,327	146,115
Numerical controls for				
controlling machine tools	15,054	45,547	9,203	33,630
Machines and appliances to test metals	~	13,077	~	11,177
Machines for balancing mechanical parts	~	13,536	~	8,323
Profile projectors	~	6,660	~	5,473
Hydraulic indust. process control instr.	~	2,424	~	3,304
Pneumatic indust. process control instr.	~	4,803	~	5,434

Source: U.S. Department of Commerce

Note: ~ - unit measure is not meaningful

U.S. MACHINE TOOL IMPORTS

by Type and Country of Origin
1991

(values in thousands of dollars)

	Units	Value		Units	Value
BORING MACHINES	638	\$54,688	DRILLING MACHINES	1,063	\$40,896
Germany	103	18,250	Japan	455	27,852
Japan	41	15,446	Germany	35	3,838
Italy	82	5,278	France	5	2,240
Switzerland	8	3,965	Canada	20	1,454
France	226	3,790	Spain	216	1,392
Others	178	7,959	Others	332	4,120
GEAR CUTTING	364	\$43,234	GRINDING MACHINES	5,626	\$239,048
Germany	148	27,142	Japan	1,112	96,981
Switzerland	105	6,291	Germany	971	60,198
Japan	43	5,612	Switzerland	261	23,470
Netherlands	3	2,013	United Kingdom	590	12,725
United Kingdom	36	770	Italy	222	9,831
Others	29	1,406	Others	2,470	35,843
NC HORIZ. LATHES	2,461	\$253,757	NC VERT. LATHES	116	\$30,988
Japan	1,870	198,970	Japan	67	16,112
Germany	72	20,509	Germany	10	4,987
Taiwan	129	6,412	Taiwan	12	4,023
South Korea	95	6,043	South Korea	12	3,815
United Kingdom	76	5,436	United Kingdom	3	789
Others	219	16,387	Others	12	1,261
NON-NC LATHES	4,745	\$79,229	MILLING MACHINES	3,281	\$71,503
Germany	44	10,611	Japan	105	16,738
Japan	130	9,496	Germany	80	11,238
Taiwan	1,194	9,396	Taiwan	1,259	10,065
Switzerland	53	7,781	Spain	1,229	9,876
United Kingdom	385	7,730	Switzerland	21	8,056
Others	2,939	34,215	Others	587	15,530

(continued)

Note: represents machines valued over \$3,025 only

U.S. MACHINE TOOL IMPORTS

by Type and Country of Origin
1991
(continued)

(values in thousands of dollars)

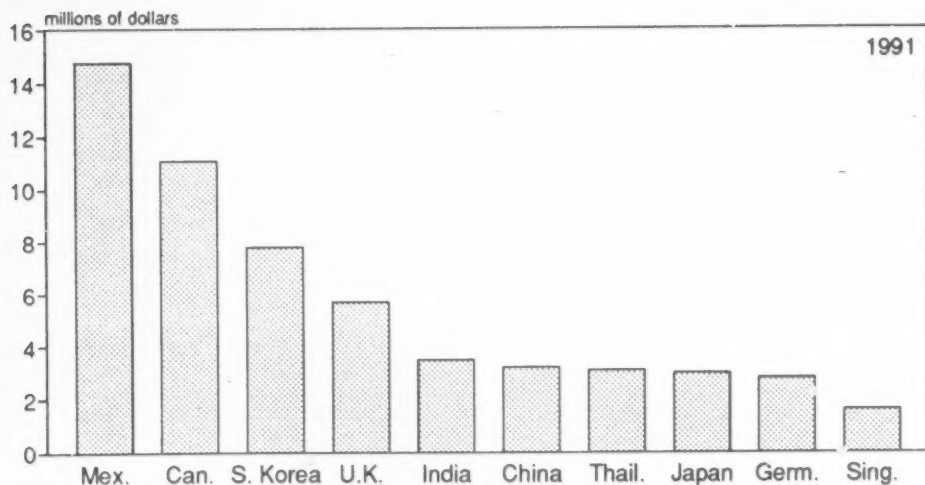
	<u>Units</u>	<u>Value</u>		<u>Units</u>	<u>Value</u>
MACHINING CENTERS	2,636	\$312,618	STATION TYPE	202	\$217,879
Japan	1,709	222,756	Germany	62	120,479
Germany	91	22,879	Japan	47	71,415
United Kingdom	212	16,471	Italy	14	9,885
Taiwan	182	13,745	Switzerland	30	6,143
Italy	32	12,253	Canada	20	5,104
Others	410	24,514	Others	29	4,853
Imports, continued					
OTHER CUTTING	3,536	\$166,345	PUNCHING & SHEARING	985	\$57,896
Japan	1,284	85,108	Japan	196	18,492
Germany	450	32,454	Germany	211	14,561
Switzerland	275	20,715	Italy	121	7,108
United Kingdom	73	5,901	Finland	17	6,133
Thailand	141	5,663	Canada	61	2,370
Others	1,313	16,504	Others	379	9,232
BENDING & FORMING	1,707	\$81,238	PRESSES	2,880	\$141,619
Japan	554	31,905	Japan	551	77,948
Canada	428	13,885	Brazil	3	18,652
Germany	119	10,732	Germany	169	18,139
Sweden	131	6,034	Canada	257	12,932
United Kingdom	54	5,280	Sweden	36	3,268
Others	421	13,402	Others	1,864	10,680
FORGING MACHINES	764	\$56,895	OTHER FORMING	2,573	\$122,212
Japan	316	24,348	Japan	689	41,478
Germany	131	12,192	Germany	390	29,101
Italy	55	6,623	Switzerland	360	12,395
Switzerland	17	2,696	Italy	452	11,997
United Kingdom	84	2,485	Canada	182	10,042
Others	161	8,551	Others	500	17,199

Source: U.S. Department of Commerce

Note: represents machines valued over \$3,025 only

U.S. MACHINE TOOL EXPORTS

**Metal Cutting
Used and Rebuilt**



(in millions of dollars)

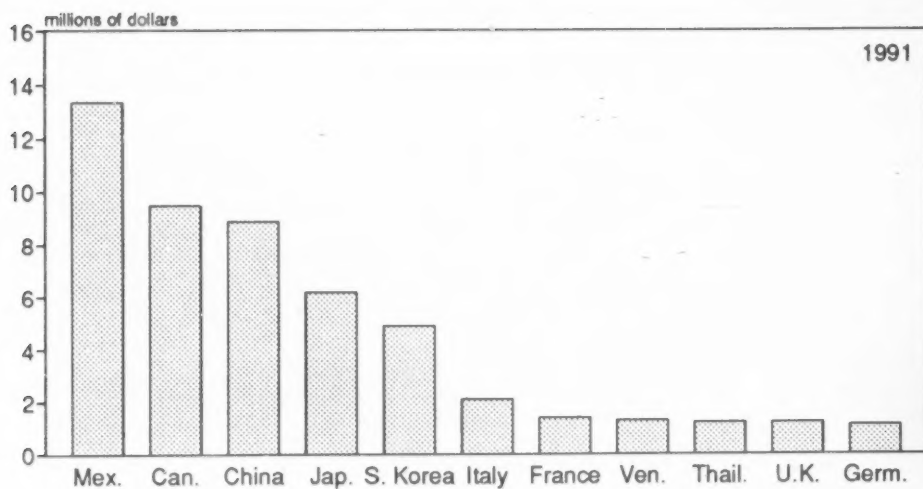
Country of Destination	1987	1988	1989	1990	1991
TOTAL	\$44.6	\$60.6	\$53.9	\$58.2	\$76.6
Mexico	11.8	16.8	12.6	9.7	14.8
Canada	5.1	5.6	6.5	9.1	11.1
South Korea	3.0	6.4	3.4	5.7	7.8
United Kingdom	1.8	4.7	2.9	2.8	5.7
India	(a)	0.5	1.0	2.1	3.5
China	1.7	3.4	5.4	1.1	3.2
Thailand	na	na	0.7	0.2	3.1
Japan	1.0	1.5	1.9	2.7	3.0
Germany	1.3	0.7	1.8	6.9	2.8
Singapore	1.9	0.9	1.6	1.5	1.6

Source: U.S. Department of Commerce

Note: (a) — Less than \$50,000

U.S. MACHINE TOOL EXPORTS

*Metal Forming
Used and Rebuilt*



(in millions of dollars)

Country of Destination	1987	1988	1989	1990	1991
TOTAL	\$19.1	\$16.7	\$63.7	\$61.5	\$66.0
Mexico	3.1	5.2	10.1	13.4	13.4
Canada	0.6	2.2	5.0	11.5	9.5
China	3.3	1.2	3.3	1.5	8.9
Japan	0.1	0.2	2.0	2.4	6.2
South Korea	5.3	1.5	10.2	7.4	4.9
Italy	0.1	0.2	0.6	0.6	2.1
France	0.0	0.9	0.6	1.9	1.4
Venezuela	2.9	0.1	3.7	0.7	1.3
Thailand	na	na	1.5	0.5	1.2
United Kingdom	0.3	1.1	1.2	1.7	1.2
Germany	0.4	0.6	1.4	2.4	1.1

Source: U.S. Department of Commerce

U.S. MACHINE TOOL EXPORTS

Metal Cutting by Machine Classification

(values in thousands of dollars)

Machine Classification	1990		1991	
	Units	Value	Units	Value
MACHINE TOOL TOTAL	82,081	\$1,062,491	86,061	\$1,076,140
of which NC	2,697	347,111	2,485	304,298
METAL CUTTING TOTAL	55,802	600,022	59,293	597,786
of which NC	1,812	259,312	1,773	240,853
Electro-discharge machines	92	7,923	138	9,976
Machining centers	388	56,616	297	58,898
Vertical, Y-axis travel	100	18,626	92	24,842
Not over 660mm (26")	81	14,083	72	12,190
Over 660mm (26")	19	4,543	20	12,652
Horizontal	54	14,676	45	16,054
Other	234	23,314	160	18,002
Station type machines	82	51,075	105	48,594
Unit construction machines	11	5,100	20	6,494
of which NC	2	230	7	3,404
Multi-station transfer machines	45	39,548	81	41,843
of which NC	21	33,589	8	14,559
Way-type unit head machines	26	6,427	4	257
Lathes	1,271	73,928	883	54,298
NC horizontal lathes	409	43,898	311	36,023
Multiple spindle	25	5,881	45	6,033
Single spindle, power rating	384	38,017	266	29,990
Under 18.65 kW (25 HP)	294	23,157	199	17,451
18.65-37.3 kW (25-50 HP)	68	9,273	36	5,892
Over 37.3 kW (50 HP)	22	5,587	31	6,647
Non-NC horizontal lathes	648	11,076	433	11,669
Engine or toolroom	117	2,020	38	593
Automatic bar and/or chucking machines, single spindle	20	532	19	309
Automatic bar and/or chucking machines, multi spindle, non-NC	57	2,883	51	3,382
Other non-NC horizontal	454	5,641	325	7,385
NC vertical lathes	72	13,150	31	2,507
Vertical turret, multiple spindle	4	1,255	1	45
Other vertical turret lathes	6	1,443	3	644
Other multiple spindle	15	1,347	0	0
Other NC vertical lathes	47	9,105	27	1,818
Non-NC vertical lathes	142	5,804	108	4,099
Vertical turret	61	1,247	30	1,069
Other non-NC vertical lathes	81	4,557	78	3,030
Drilling machines	974	17,998	1,242	23,386
NC drilling	101	9,039	180	13,852
Non-NC drilling	873	8,959	1,062	9,534
Multiple spindle	33	1,704	4	474
Radial	21	209	39	1,291
Upright, excluding sensitive, turret and deep hole	103	2,192	30	989
Other non-NC drilling	716	4,854	989	6,780
Boring-milling machines	62	7,064	56	8,095
NC horiz. spindle, table type, excl. planer type	4	1,664	2	1,280
Other NC horizontal spindle	8	2,856	7	4,062

(continued)

U.S. MACHINE TOOL EXPORTS

Metal Cutting by Machine Classification (continued)

(values in thousands of dollars)

Machine Classification	1990		1991	
	Units	Value	Units	Value
Other NC boring-milling	20	\$1,155	25	\$1,836
Non-NC horizontal spindle	2	250	4	253
Other non-NC boring-milling	28	1,139	18	664
Boring machines	92	8,744	122	6,824
NC vertical	8	2,483	7	670
Other NC boring	9	3,308	11	1,234
Non-NC vertical	44	1,451	33	1,595
Other non-NC boring	31	1,502	71	3,325
Milling machines	443	34,996	575	34,341
NC knee type	22	2,273	27	1,919
Non-NC knee type	124	4,402	106	3,865
Other NC milling	59	20,911	66	18,420
Non-NC profile, duplicating, or die sinking	26	555	5	34
Non-NC bed type	2	288	2	69
Other non-NC milling	210	6,567	369	10,034
Threading or tapping machines	767	8,157	351	11,797
of which NC	41	1,577	77	2,798
Grinding or polishing machines	4,026	130,596	3,527	107,711
Surface	184	18,281	182	10,925
NC	86	9,339	82	5,302
Non-NC reciproc. table type	59	1,040	64	881
Other non-NC surface	39	7,902	36	4,742
Other grinding machines	602	57,765	551	59,419
NC	112	32,263	113	36,736
Non-NC external cylindrical, incl. universal	53	6,269	34	5,144
Non-NC internal cylindrical	53	3,594	44	5,307
Other non-NC	384	15,639	360	12,232
Tool or cutter grinding	1,133	18,981	904	10,333
NC	49	4,252	31	2,120
Non-NC	1,084	14,729	873	8,213
Honing or lapping	897	15,436	497	8,093
NC	4	827	13	974
Non-NC	893	14,609	484	7,119
Other grind, polish, finish, etc.	1,210	20,133	1,393	18,941
NC	20	1,402	13	1,704
Non-NC	1,190	18,731	1,380	17,237
Planing machines	285	8,233	209	6,686
of which NC	6	788	2	219
Shaping or slotting machines	47	1,533	46	2,389
of which NC	9	365	17	1,633
Broaching machines	41	3,666	55	7,588
of which NC	13	1,600	12	2,732
Gear cutting machines	256	58,880	305	66,219
Gear hobbors	42	5,758	94	7,608
Gear shapers	51	7,000	13	1,445
Other gear cutting machines	96	40,356	101	47,957
Gear grinding or finishing	67	5,766	97	9,209
Sawing or cutting-off machines	1,589	23,722	1,472	23,026
of which NC	123	4,492	114	5,814
Other metal cutting machines	1,256	25,202	903	26,700
Used or rebuilt cutting machines	5,007	58,208	6,816	76,636
Cutting machines valued less than \$3,025	39,124	23,482	42,191	24,624

Source: U.S. Department of Commerce

LEADING U.S. MACHINE TOOL EXPORT MARKETS

All Machine Tools

(values in millions of dollars)

Country	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
World	\$615.0	\$406.0	\$409.3	\$452.4	\$590.3	\$650.4	\$768.3	\$949.8	\$1,062.5	\$1,076.1
Canada	82.3	61.7	82.6	82.0	85.0	98.5	108.7	110.8	183.0	134.6
Mexico	135.9	42.5	45.7	63.8	93.9	89.0	126.8	107.3	109.3	124.9
Germany	21.8	30.9	21.4	23.1	37.0	32.0	40.4	61.5	91.3	100.2
Japan	51.0	35.7	39.4	36.2	52.1	55.4	64.1	78.1	83.7	94.4
South Korea	11.2	8.8	8.3	14.9	31.4	85.9	73.2	98.6	81.8	93.2
China	2.4	16.6	13.0	26.6	50.5	42.5	37.4	40.8	37.3	70.7
United Kingdom	59.8	35.0	40.8	31.2	43.3	24.9	57.7	99.9	83.4	58.4
France	19.2	12.5	11.6	6.7	10.6	12.2	16.8	22.4	28.3	41.8
Italy	14.9	15.5	6.8	11.2	16.8	16.0	21.3	24.6	28.2	26.4
Taiwan	8.1	9.2	5.2	6.6	11.7	12.0	25.6	32.2	28.2	22.3
Brazil	21.0	10.9	18.5	24.6	16.5	24.9	21.0	21.2	27.8	19.9
USSR	1.3	7.5	0.6	1.2	1.3	3.2	1.3	21.9	8.6	19.8
Belgium	2.9	1.5	4.3	2.3	23.5	12.6	7.6	12.4	22.9	16.1
Thailand	0.8	1.9	1.8	1.6	0.3	1.8	5.7	6.5	8.6	15.8
Argentina	39.2	20.6	22.6	31.3	16.4	38.3	44.6	29.9	26.3	15.5
Singapore	14.7	9.3	5.1	12.4	8.1	10.0	9.3	16.1	15.3	15.1
India	15.4	5.4	6.4	6.6	9.9	5.7	10.7	20.5	27.6	14.8
Netherlands	3.3	2.7	2.0	2.9	3.5	4.6	7.4	11.5	15.9	14.7
Venezuela	14.3	2.9	5.3	7.0	6.5	13.6	25.2	14.0	9.8	14.3
Australia	11.1	8.0	7.3	14.6	8.1	11.4	14.3	18.2	23.1	13.9
Ireland	4.2	4.5	4.0	2.2	2.2	2.0	3.7	6.8	3.0	11.5
Hong Kong	2.5	2.2	3.1	4.5	2.2	4.1	7.3	11.4	7.5	11.0
Indonesia	0.7	0.9	0.7	3.2	1.5	1.7	0.9	4.4	7.4	10.8
Spain	6.3	2.1	2.7	3.7	3.2	2.8	7.2	7.4	11.8	9.8
All Others	70.1	57.2	50.1	32.0	54.8	45.3	30.1	71.4	92.4	106.0

Source: U.S. Department of Commerce

LEADING U.S. MACHINE TOOL EXPORT MARKETS

Metal Cutting

(values in millions of dollars)

Country	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
World	\$403.5	\$258.3	\$250.2	\$285.9	\$371.3	\$383.5	\$443.7	\$488.8	\$600.0	\$597.8
Canada	57.6	33.8	45.4	49.3	43.6	60.5	61.5	68.4	115.6	90.5
Mexico	78.0	24.6	31.4	40.3	63.8	54.9	89.0	60.2	54.6	62.5
Germany	16.5	17.0	12.7	12.1	20.9	19.5	17.8	31.3	61.2	58.0
Japan	36.6	30.1	23.8	20.1	35.8	29.3	30.0	30.7	45.5	51.1
South Korea	9.0	6.0	6.7	9.8	19.2	44.3	48.2	36.0	47.1	48.6
China	2.0	13.1	10.1	21.7	34.8	22.1	27.1	29.1	20.5	38.0
United Kingdom	49.3	29.5	30.6	19.9	35.8	15.0	32.4	60.2	46.2	28.9
USSR	1.2	7.4	0.6	0.4	1.0	2.1	1.2	20.9	1.1	19.3
France	13.9	5.1	4.1	3.6	4.6	5.8	7.6	11.8	8.9	18.5
Italy	6.5	8.7	6.0	8.9	6.7	10.5	13.1	14.8	19.0	15.8
Argentina	6.0	1.1	2.0	1.1	0.8	1.6	1.4	1.6	1.1	13.8
India	11.7	4.2	2.8	4.4	7.7	4.5	8.3	11.6	20.9	13.7
Brazil	16.2	8.0	17.4	20.9	4.3	15.6	10.7	11.8	17.6	11.8
Taiwan	7.3	7.8	4.2	3.8	4.1	7.5	13.0	9.6	11.3	11.1
Venezuela	7.0	1.6	1.8	5.5	3.6	5.7	15.2	5.5	7.2	11.0
Belgium	2.1	0.8	3.3	1.4	20.9	11.5	6.1	7.6	20.1	10.3
Singapore	11.6	6.3	2.3	7.4	5.1	5.2	6.8	7.9	8.7	8.9
Egypt	2.4	0.7	2.3	1.4	0.3	0.3	6.8	0.4	2.0	7.9
Hong Kong	1.5	1.6	2.3	3.1	1.9	2.3	3.0	4.6	5.2	6.1
Switzerland	5.4	5.2	2.0	2.6	4.9	3.9	2.9	4.0	5.7	5.4
Thailand	0.6	1.8	1.7	0.4	0.2	0.3	1.2	2.6	2.3	5.3
Spain	4.0	1.4	1.1	3.0	2.0	1.1	2.1	3.2	6.0	5.0
Indonesia	0.6	0.3	0.1	3.1	1.5	1.0	0.4	4.2	0.4	4.8
Netherlands	1.3	1.2	0.7	1.7	2.4	1.8	2.9	4.6	6.2	4.8
Australia	6.1	3.2	2.0	4.0	3.9	5.9	3.6	11.2	15.7	4.3
All Others	49.1	37.8	32.8	36.0	41.5	51.3	31.4	35.0	49.9	42.4

Source: U.S. Department of Commerce

LEADING U.S. MACHINE TOOL EXPORT MARKETS

Metal Forming

(values in millions of dollars)

Country	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
World	\$211.5	\$147.7	\$159.1	\$166.5	\$219.1	\$266.9	\$324.6	\$461.0	\$462.5	\$478.4
Mexico	57.9	17.9	14.4	23.5	30.1	34.1	37.9	47.0	54.7	62.4
South Korea	2.3	2.8	1.6	5.1	12.2	41.5	25.0	62.6	34.7	44.6
Canada	24.7	28.0	37.2	32.7	41.4	38.0	47.2	42.4	67.4	44.1
Japan	14.4	5.6	15.6	16.1	16.4	26.1	34.2	47.5	38.2	43.3
Germany	5.3	13.9	8.8	10.9	16.1	12.5	22.6	30.2	30.2	42.1
China	0.4	3.6	2.8	4.9	15.7	20.4	10.3	11.7	16.7	32.7
United Kingdom	10.5	5.6	10.2	11.3	7.5	10.0	25.4	39.7	37.1	29.6
France	5.3	7.4	7.5	3.1	6.1	6.4	9.2	10.6	19.4	23.3
Taiwan	0.8	1.4	0.9	2.8	7.6	4.5	12.6	22.6	17.0	11.2
Italy	8.5	6.8	0.8	2.3	10.1	5.4	8.1	9.9	9.2	10.6
Thailand	0.1	0.1	0.1	1.2	0.1	1.4	4.5	3.9	6.3	10.5
Netherlands	2.0	1.5	1.4	1.2	1.1	2.8	4.6	6.9	7.4	10.0
Australia	5.0	4.7	5.3	10.6	4.3	5.5	10.7	7.1	7.4	9.7
Ireland	0.7	2.7	0.8	0.7	1.2	1.3	2.3	5.6	1.8	8.2
Brazil	4.8	3.0	1.1	3.8	2.3	9.3	10.3	9.4	10.2	8.1
Philippines	1.2	0.6	1.2	0.6	0.3	0.2	0.9	1.3	6.4	6.4
Turkey	0.5	0.8	1.7	1.6	8.1	4.8	2.2	0.5	0.4	6.3
Singapore	3.1	2.9	2.8	5.0	3.0	4.8	2.5	8.2	6.6	6.2
Indonesia	1.0	0.6	0.6	0.2	(a)	0.7	0.5	0.2	6.9	6.0
Belgium	0.8	0.7	1.0	0.9	2.6	1.1	1.5	4.8	2.8	5.8
Saudi Arabia	9.0	1.3	9.4	0.9	8.8	0.3	1.6	5.2	5.0	5.8
Hong Kong	1.0	0.6	2.3	1.4	0.3	1.8	4.3	6.9	2.3	4.9
Spain	2.3	0.6	1.4	0.7	1.2	1.7	5.2	4.3	5.8	4.8
Venezuela	7.3	1.3	3.5	1.5	2.9	8.0	10.0	8.4	2.5	3.3
All Others	42.6	33.3	26.7	23.5	19.7	24.3	31.0	64.1	66.1	38.5

Source: U.S. Department of Commerce

Note: (a) — Less than \$50,000

U.S. MACHINE TOOL EXPORTS

Metal Forming by Machine Classification

(values in thousands of dollars)

Machine Classification	1990		1991	
	Units	Value	Units	Value
METAL FORMING TOTAL	26,279	\$462,469	26,768	\$478,353
of which NC	885	87,799	712	63,445
Die casting machines	365	\$8,996	367	\$7,076
Forging or die-stamping machines	360	51,210	362	54,737
Headers or upsetters, including				
cold headers	61	23,979	60	23,669
Other forge, stamp, or hammers	299	27,231	302	31,068
Bend, fold, straighten, etc.	1,859	73,709	1,630	67,966
NC	390	36,209	265	24,808
Non-NC press brakes	158	3,793	122	3,598
Non-NC bending rolls	102	3,209	54	1,832
Other non-NC	1,209	30,498	1,189	37,728
Punching or shearing machines	1,569	65,370	1,357	54,513
Shearing machines	516	17,475	450	17,978
NC	92	7,790	96	7,614
Non-NC	424	9,685	354	10,364
Punching or notching machines,				
incl. combination punch and shear	1,053	47,895	907	36,535
NC	172	26,135	132	18,489
Non-NC	881	21,760	775	18,046
Presses	2,032	99,165	1,857	86,698
Hydraulic presses	665	32,783	619	20,135
NC	84	4,935	26	964
Non-NC	581	27,848	593	19,171
Other presses	1,367	66,382	1,238	66,563
NC	147	12,730	193	11,570
Non-NC mechanical	108	12,548	145	14,271
Other non-NC	1,112	41,104	900	40,722
Draw benches for bars, tubes, etc.	242	6,670	234	7,295
Thread rolling machines	60	2,726	57	1,749
Machines for working wire	750	23,651	751	22,544
Other metal forming machine tools	1,636	58,520	1,535	97,749
Used or rebuilt forming machines	3,242	61,461	3,207	65,970
Forming machines valued less than \$3,025	14,164	10,991	15,411	12,056

Source: U.S. Department of Commerce

U.S. EXPORTS

Other Manufacturing Technology by Machine Classification

(values in thousands of dollars)

Machine Classification	1990		1991	
	Units	Value	Units	Value
Machine tool parts and accessories	~	\$722,127	~	\$675,905
Parts for machines for working				
rubber or plastics	~	282,599	~	255,532
Quenching or cutting oils	~	18,520	~	6,874
Industrial robots for lifting,				
handling, loading or unloading	360	6,637	710	9,564
Other industrial robots	6,146	58,292	5,728	69,263
Parts for industrial robots for				
lifting, handling, etc.	~	74,510	~	97,270
Other industrial robot parts	~	27,524	~	37,355
Laser, light or photon beam machines				
for working any material	933	46,118	565	34,149
Ultrasonic process machines for				
working any material	77	1,915	70	3,970
Injection molding machines	728	75,948	784	75,676
For rubber or other thermosetting	305	21,848	251	19,596
For thermoplastics	423	54,100	533	56,080
Extruders	1,197	58,111	848	57,917
For rubber or other thermosetting	352	16,584	256	20,074
For processing thermoplastics	845	41,527	595	37,843
Blow molding machines	557	43,754	599	37,077
Vacuum-molding and other				
thermoforming machines	4,713	13,781	1,237	9,535
Machines for molding or				
Retreading pneumatic tires	1,522	20,511	2,630	18,241
Otherwise forming inner tubes	449	29,446	670	13,093
Otherwise forming other	1,467	23,546	1,850	32,223
Other machines for working				
rubber or plastics	5,684	109,676	4,595	89,459
Numerical controls for				
controlling machine tools	1,937	28,709	1,597	22,996
Machines and appliances to test metals	~	75,730	~	68,988
Machines for balancing mechanical parts	~	28,815	~	30,800
Profile projectors	~	6,956	~	5,223
Hydraulic or pneumatic industrial				
process control instruments	~	59,130	~	50,668

Source: U.S. Department of Commerce

Note: ~ - unit measure is not meaningful

U.S. MACHINE TOOL EXPORTS
**by Type and Country of Destination
1991**

(values in thousands of dollars)

	<u>Units</u>	<u>Value</u>		<u>Units</u>	<u>Value</u>
BORING MACHINES	173	\$14,919	DRILLING MACHINES	1,242	\$23,386
Italy	5	2,908	Germany	95	7,041
Canada	22	2,765	Canada	395	3,431
Mexico	34	1,984	Mexico	170	2,865
Egypt	57	1,627	Taiwan	15	2,233
Germany	3	1,315	Japan	26	1,354
Others	57	4,320	Others	541	6,462
 GEAR CUTTING	 305	 \$66,219	 GRINDING MACHINES	 3,527	 \$107,710
Japan	38	17,742	Canada	548	15,938
Germany	48	10,583	Japan	315	11,380
South Korea	29	8,260	Germany	340	10,616
Italy	25	6,088	South Korea	404	10,010
USSR	8	5,034	China	101	8,648
Others	157	18,512	Others	1,819	51,118
 NC HORIZ. LATHES	 311	 \$36,024	 NC VERT. LATHES	 31	 \$2,508
Canada	61	7,883	Mexico	23	1,953
United Kingdom	59	5,603	Canada	5	265
China	26	4,427	Venezuela	1	214
Mexico	30	3,493	South Korea	1	43
Japan	38	3,193	Japan	1	33
Others	97	11,425	Others	0	0
 NON-NC LATHES	 541	 \$15,768	 MILLING MACHINES	 575	 \$34,341
Mexico	193	6,554	Canada	81	8,693
Canada	75	2,297	South Korea	129	8,242
Venezuela	13	1,003	China	56	4,578
South Korea	30	888	Argentina	1	2,560
Japan	25	720	Mexico	108	2,020
Others	205	4,306	Others	200	8,248

(continued)

Note: represents machines valued over \$3,025 only

U.S. MACHINE TOOL EXPORTS

by Type and Country of Destination

1991

(continued)

(values in thousands of dollars)

	<u>Units</u>	<u>Value</u>		<u>Units</u>	<u>Value</u>
MACHINING CENTERS	297	\$58,897	STATION TYPE	105	\$48,593
Canada	81	11,895	Germany	13	12,904
China	18	8,340	USSR	15	12,635
Argentina	2	8,208	Canada	12	6,348
Mexico	63	7,688	France	36	4,520
Belgium	18	2,986	China	3	3,157
Others	115	19,780	Others	26	9,029
OTHER CUTTING	3,174	\$88,161	PUNCHING & SHEARING	1,357	\$54,513
Canada	545	14,308	Mexico	263	11,122
Germany	210	9,127	Canada	250	7,846
Japan	348	8,602	Japan	61	4,411
Mexico	289	6,891	Germany	113	4,225
South Korea	189	5,289	United Kingdom	51	3,465
Others	1,593	43,944	Others	619	23,444
BENDING & FORMING	1,630	\$67,966	PRESSES	1,857	\$86,697
Mexico	272	12,968	Germany	144	16,015
Canada	375	11,495	Mexico	802	14,888
United Kingdom	310	9,853	United Kingdom	102	7,600
South Korea	29	3,435	Japan	122	7,080
Philippines	29	3,375	South Korea	61	5,657
Others	615	26,840	Others	626	35,457
FORGING MACHINES	362	\$54,737	OTHER FORMING	2,944	\$136,414
Japan	36	13,921	South Korea	319	23,675
France	80	6,447	China	81	17,578
Canada	27	4,874	Germany	307	12,983
Italy	19	4,638	Japan	270	9,022
South Korea	37	4,216	France	131	8,633
Others	163	20,641	Others	1,836	64,523

Source: U.S. Department of Commerce

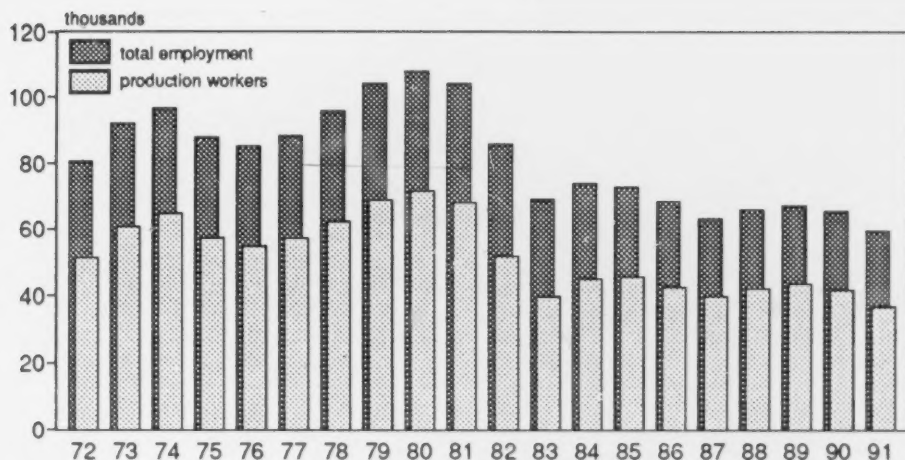
Note: represents machines valued over \$3,025 only

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D



(in thousands, annual average)

Year	Metal Cutting		Metal Forming		Cutting & Forming	
	Total Employment	Production Workers	Total Employment	Production Workers	Total Employment	Production Workers
1971	56.6	39.4	na	na	na	na
1972	58.4	36.6	22.3	14.8	80.7	51.4
1973	66.6	43.4	25.5	17.5	92.1	60.9
1974	68.9	45.8	27.9	19.1	96.8	64.9
1975	63.7	41.7	24.3	15.7	88.0	57.4
1976	62.4	39.9	23.0	15.0	85.4	54.9
1977	65.2	41.9	23.3	15.4	88.5	57.3
1978	70.9	45.9	25.0	16.5	95.9	62.4
1979	77.4	51.2	26.9	17.7	104.3	68.9
1980	81.6	54.7	26.4	17.0	108.0	71.1
1981	80.0	52.0	24.4	15.3	104.4	68.1
1982	64.9	39.3	21.0	12.6	85.9	51.9
1983	52.0	29.9	17.1	9.9	69.1	39.8
1984	55.3	33.7	18.6	11.4	73.9	45.1
1985	53.8	33.9	19.2	11.8	73.0	45.7
1986	49.8	31.3	18.8	11.4	68.6	42.7
1987	46.2	29.1	17.2	10.8	63.4	39.9
1988	48.0	30.5	18.1	11.7	66.1	42.2
1989	48.9	31.7	18.4	11.9	67.3	43.6
1990(r)	47.2	30.3	18.5	11.6	65.7	41.9
1991(p)	42.9	26.8	16.6	10.1	59.5	36.9

Source: U.S. Bureau of Labor Statistics

Note: p - preliminary, r - revised, na - not available

**AVERAGE WEEKLY EARNINGS
FOR PRODUCTION WORKERS**

U.S. Metal Cutting

Year	Weekly Hours	Hourly Earnings	Weekly Earnings
1971	39.4	\$4.20	\$165.48
1972	42.8	4.62	197.74
1973	45.1	4.90	220.99
1974	46.4	5.12	237.57
1975	42.7	5.54	236.56
1976	41.8	6.03	252.05
1977	43.9	6.61	290.18
1978	44.8	7.20	322.56
1979	44.3	7.71	344.21
1980	43.7	8.38	366.21
1981	42.1	9.12	383.95
1982	38.9	9.78	380.44
1983	39.0	9.91	386.49
1984	42.4	10.20	432.48
1985	42.6	10.58	450.71
1986	42.4	10.96	464.70
1987	42.0	11.08	465.36
1988	43.0	11.32	486.76
1989	43.9	11.67	512.31
1990	41.6	12.20	507.52
1991	41.8	12.85	537.13

**AVERAGE WEEKLY EARNINGS
FOR PRODUCTION WORKERS**

U.S. Metal Forming

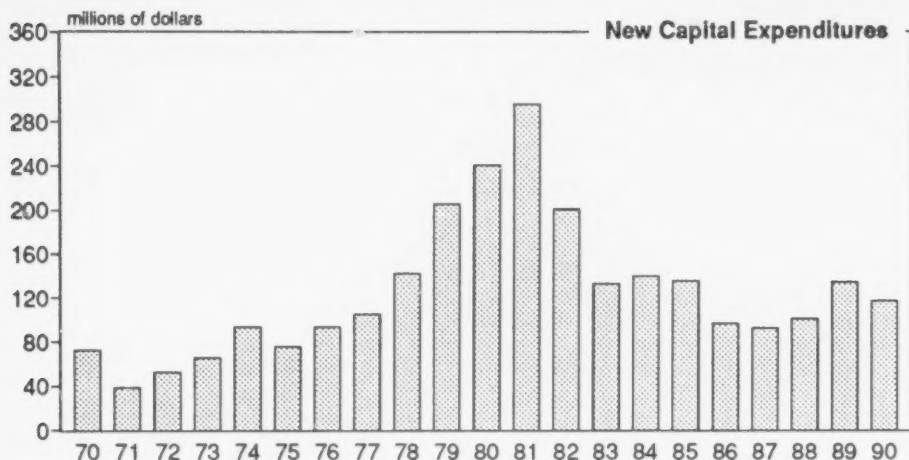
Year	Weekly Hours	Hourly Earnings	Weekly Earnings
1971	na	na	na
1972	42.4	\$4.55	\$192.92
1973	44.5	4.93	219.39
1974	43.3	5.28	228.62
1975	41.8	5.51	230.32
1976	42.1	6.04	254.28
1977	42.1	6.56	276.18
1978	43.0	7.34	315.62
1979	42.3	7.82	330.79
1980	41.2	8.48	349.38
1981	39.3	9.27	364.31
1982	38.0	9.97	378.86
1983	38.6	10.45	403.37
1984	42.4	10.61	449.86
1985	41.9	10.93	457.97
1986	42.0	11.49	482.58
1987	42.5	11.52	489.60
1988	44.8	11.86	531.33
1989	44.2	12.15	537.03
1990	43.1	12.41	534.87
1991	41.6	12.54	521.66

Source: U.S. Bureau of Labor Statistics

Note: na - not available

GENERAL STATISTICS

U.S. Machine Tool Industry



(millions of dollars)

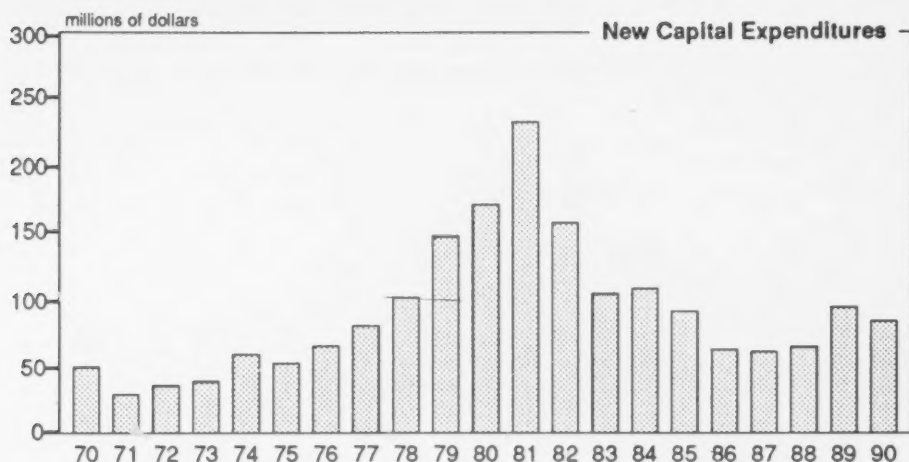
Year	Establishments		Value Added Manufacture	Cost of Materials	Value of Shipments	New Capital Expenditures	End of Year Inventories
	Total	With 20 or More Employees					
1970	na	na	\$1,581.7	\$ 992.6	\$2,597.8	\$ 72.7	\$ 820.5
1971	na	na	1,183.7	751.2	2,018.8	39.1	726.0
1972	1,277	437	1,319.4	821.6	2,114.4	52.7	724.9
1973	na	na	1,760.6	1,134.9	2,777.3	65.9	885.7
1974	na	na	2,250.7	1,523.3	3,579.8	93.3	1,150.0
1975	na	na	2,258.6	1,533.5	3,834.4	76.1	1,100.4
1976	na	na	2,285.2	1,286.2	3,566.9	93.5	1,048.3
1977	1,343	469	2,588.0	1,491.7	3,943.3	105.1	1,237.5
1978	na	na	3,108.3	1,994.1	4,977.8	142.4	1,434.0
1979	na	na	3,837.8	2,423.9	6,052.5	205.7	1,689.2
1980	na	na	4,391.3	2,744.6	6,980.7	241.0	1,874.6
1981	na	na	4,716.4	2,850.0	7,481.0	296.2	1,965.2
1982	1,394	455	3,294.0	2,172.9	5,840.2	201.1	1,947.0
1983	na	na	2,242.3	1,554.9	4,023.2	132.9	1,713.2
1984	na	na	2,595.9	1,904.9	4,520.3	139.8	1,620.5
1985	na	na	2,933.2	2,070.3	4,789.8	135.3	1,919.0
1986	na	na	2,589.5	2,251.2	4,964.0	96.6	1,739.8
1987	652	371	2,403.0	2,037.3	4,585.8	92.3	1,586.1
1988	na	na	2,749.3	2,228.8	4,890.5	101.0	1,643.7
1989(r)	na	na	3,072.5	2,423.7	5,352.5	134.0	1,825.1
1990(p)	na	na	2,744.1	2,461.2	5,259.5	117.5	1,804.9

Sources: U.S. Bureau of the Census, "Census of Manufactures, 1972, 1977, 1982, 1987 *Metaworking Machinery and Equipment*" and "Annual Survey of Manufactures"

Note: p - preliminary, r - revised, na - not available. The machine tool industry (Standard Industrial Classification SIC 3541 and 3542) produces primarily metal cutting and metal forming machine tools. It also produces other (secondary) products, such as small cutting tools, attachments and accessories and others. These secondary products as well as machine tool parts and some other items are included in this table. It therefore differs from other Census and AMT data on shipments of machine tools.

GENERAL STATISTICS

U.S. Metal Cutting



(millions of dollars)

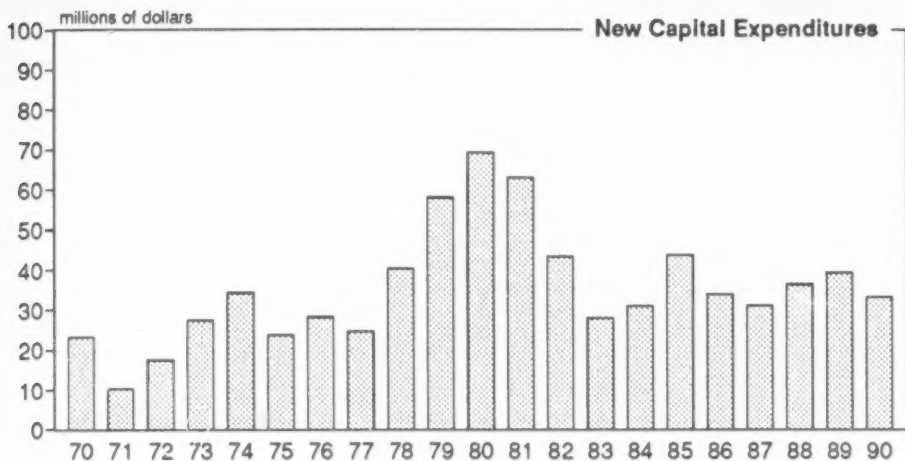
Year	Establishments		Value Added Manufacture	Cost of Materials	Value of Shipments	New Capital Expenditures	End of Year Inventories
	Total	With 20 or More Employees					
1970	na	na	\$1,112.1	\$ 664.0	\$1,821.7	\$ 49.3	\$ 562.9
1971	na	na	819.8	473.2	1,351.1	28.7	492.8
1972	894	275	901.7	536.3	1,418.1	35.2	482.2
1973	na	na	1,214.1	764.1	1,891.1	38.4	591.9
1974	na	na	1,617.0	1,017.9	2,480.5	58.9	786.2
1975	na	na	1,640.3	1,050.3	2,727.8	52.2	737.9
1976	na	na	1,664.1	852.3	2,496.2	65.2	735.4
1977	917	306	1,866.1	1,047.7	2,812.7	80.4	877.9
1978	na	na	2,267.0	1,417.7	3,611.8	102.0	1,012.3
1979	na	na	2,833.8	1,736.9	4,389.0	147.6	1,242.2
1980	na	na	3,349.2	2,026.1	5,227.6	171.6	1,419.4
1981	na	na	3,739.9	2,187.3	5,865.3	233.2	1,485.5
1982	942	293	2,516.2	1,598.3	4,411.5	157.7	1,435.5
1983	na	na	1,612.7	1,100.0	2,880.9	104.8	1,281.6
1984	na	na	1,820.0	1,369.5	3,211.6	108.8	1,196.5
1985	na	na	2,000.0	1,471.6	3,377.0	91.6	1,349.7
1986	na	na	1,823.8	1,538.0	3,456.1	62.7	1,215.6
1987	417	232	1,668.7	1,399.5	3,189.5	61.1	1,056.8
1988	na	na	1,828.1	1,404.4	3,137.8	64.5	1,093.3
1989(r)	na	na	2,112.7	1,629.8	3,622.9	94.5	1,252.0
1990(p)	na	na	1,890.3	1,682.8	3,606.8	84.2	1,261.8

Sources: U.S. Bureau of the Census, "Census of Manufactures, 1972, 1977, 1982, 1987 Metalworking Machinery and Equipment" and "Annual Survey of Manufactures"

Note: p - preliminary, r - revised, na - not available. The metal cutting machine tool industry (Standard Industrial Classification SIC 3541) produces primarily metal cutting machine tools. It also produces other (secondary) products, such as plastics machinery, small cutting tools, attachments and accessories and others. These secondary products as well as machine tool parts and some other items are included in this table. It therefore differs from other Census and AMT data on shipments of machine tools.

GENERAL STATISTICS

U.S. Metal Forming



(millions of dollars)

Year	Establishments		Value Added Manufacture	Cost of Materials	Value of Shipments	New Capital Expenditures	End of Year Inventories
	Total	With 20 or More Employees					
1970	na	na	\$ 469.6	\$328.6	\$ 776.1	\$23.4	\$257.6
1971	na	na	363.9	278.0	667.7	10.4	233.2
1972	383	162	417.7	285.3	696.3	17.5	242.7
1973	na	na	546.5	370.8	886.2	27.5	293.8
1974	na	na	633.7	505.4	1,099.3	34.4	363.8
1975	na	na	618.3	483.2	1,106.6	23.9	362.5
1976	na	na	621.1	433.9	1,070.7	28.3	312.9
1977	426	163	721.9	444.0	1,130.6	24.7	359.6
1978	na	na	841.3	576.4	1,366.0	40.4	421.7
1979	na	na	1,004.0	687.0	1,663.5	58.1	447.0
1980	na	na	1,042.1	718.5	1,753.1	69.4	455.2
1981	na	na	976.5	662.7	1,615.7	63.0	479.7
1982	452	162	777.8	574.6	1,428.7	43.4	511.5
1983	na	na	629.6	454.9	1,142.3	28.1	431.6
1984	na	na	775.9	535.4	1,308.7	31.0	242.0
1985	na	na	933.2	598.7	1,412.8	43.7	569.3
1986	na	na	765.7	713.2	1,507.9	33.9	524.2
1987	207	120	734.3	637.8	1,396.3	31.2	529.3
1988	na	na	921.2	824.4	1,752.7	36.5	550.4
1989(r)	na	na	959.8	793.9	1,729.6	39.4	562.1
1990(p)	na	na	853.8	778.4	1,652.7	33.3	543.1

Sources: U.S. Bureau of the Census, "Census of Manufactures, 1972, 1977, 1982, 1987 Metalworking Machinery and Equipment" and "Annual Survey of Manufactures"

Note: p - preliminary, r - revised, na - not available. The metal forming machine tool industry (Standard Industrial Classification SIC 3542) produces primarily metal forming machine tools. It also produces other (secondary) products, such as small cutting tools, attachments and accessories and others. These secondary products as well as machine tool parts and some other items are included in this table. It therefore differs from other Census and AMT data on shipments of machine tools.

U.S. MACHINE TOOL INDUSTRY

*Employment
by State, 1990*

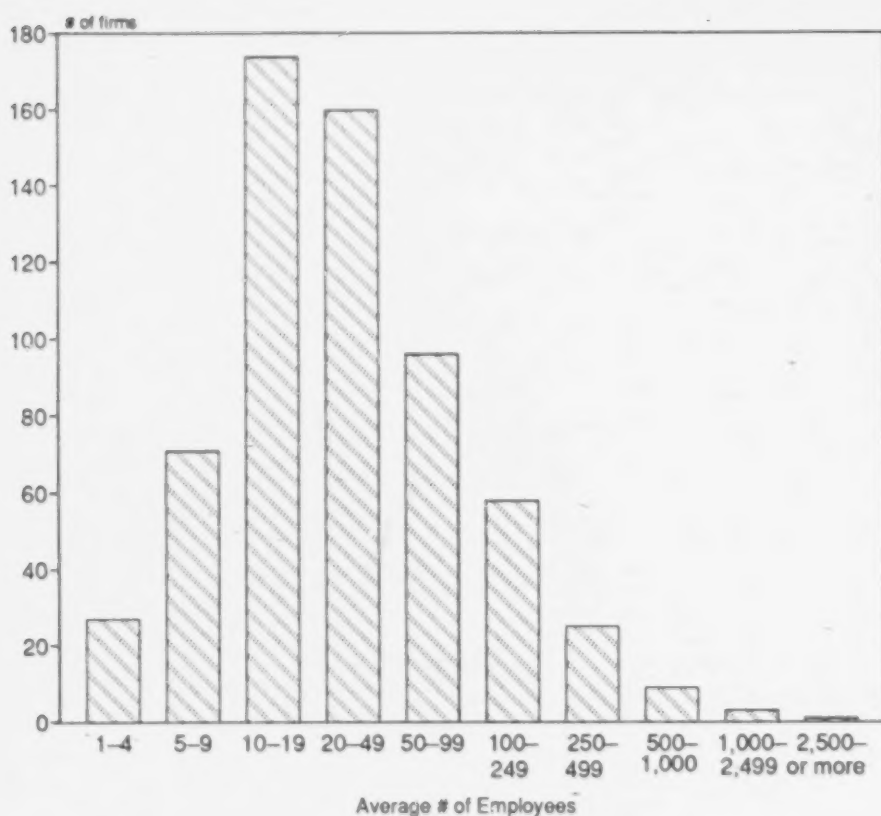
State	Metal Cutting	Metal Forming	Total
United States	46,481	18,053	64,534
Alabama	38	176	214
Alaska	D	-	D
Arizona	422	D	D
Arkansas	5	D	D
California	2,804	891	3,695
Colorado	178	D	D
Connecticut	1,907	279	2,186
Delaware	D	-	D
Florida	529	228	757
Georgia	61	456	517
Hawaii	-	-	-
Idaho	D	-	D
Illinois	5,571	3,601	9,172
Indiana	381	326	707
Iowa	395	240	635
Kansas	45	171	216
Kentucky	894	D	D
Louisiana	D	D	D
Maine	D	D	D
Maryland	7	473	480
Massachusetts	2,167	448	2,615
Michigan	6,358	1,473	7,831
Minnesota	687	132	819
Mississippi	-	-	-
Missouri	1,302	148	1,450
Montana	-	-	-
Nebraska	160	D	D
Nevada	D	-	D
New Hampshire	D	D	D
New Jersey	494	266	760
New Mexico	-	-	-
New York	3,613	1,882	5,495
North Carolina	421	348	769
North Dakota	-	-	-
Ohio	7,915	4,336	12,251
Oklahoma	233	17	250
Oregon	211	D	-
Pennsylvania	2,077	917	2,994
Rhode Island	347	81	428
South Carolina	846	150	996
South Dakota	149	D	D
Tennessee	323	51	374
Texas	287	403	690
Utah	D	D	D
Vermont	1,270	D	D
Virginia	397	28	425
Washington	190	D	D
West Virginia	-	-	-
Wisconsin	2,881	197	3,078
Wyoming	-	-	-

Source: U.S. Bureau of Labor Statistics

Note: D - not disclosed

U.S. MACHINE TOOL INDUSTRY

Distribution of Firms by Size of Work Force, 1987

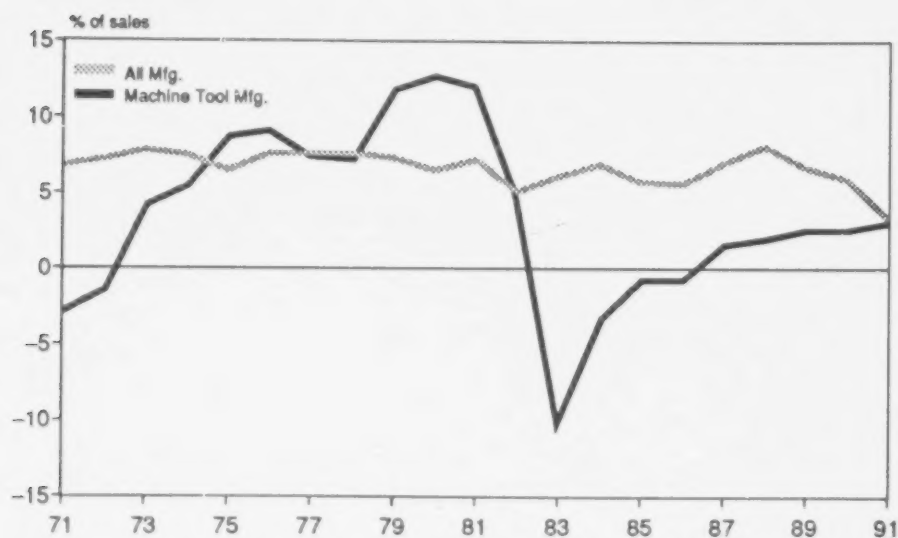


	Total # U.S. Machine Tool Firms	Metal Cutting Industry	Metal Forming Industry
TOTAL	624	417	207
Firms with an average of:			
1 - 4 employees	27	22	5
5 - 9 employees	71	52	19
10-19 employees	174	111	63
20-49 employees	160	111	49
50-99 employees	96	58	38
100-249 employees	58	36	22
250-499 employees	25	17	8
500-999 employees	9	6	3
1,000-2,499 employees	3	3	0
2,500 employees or more	1	1	0

Source: 1987 Census of Manufactures

U.S. MACHINE TOOL COMPANIES

Net Income Before Taxes



Year	As Percent of Sales		As Percent of Assets	
	All Manufacturers	Machine Tool Manufacturers	All Manufacturers	Machine Tool Manufacturers
1971	7.0%	(2.7)%	8.7%	(2.7)%
1972	7.4	(1.3)	9.5	(1.4)
1973	8.0	4.3	11.0	4.8
1974	7.7	5.6	10.7	7.2
1975	6.7	8.9	8.8	12.7
1976	7.8	9.3	10.6	12.3
1977	7.8	7.6	13.5	12.8
1978	7.8	7.4	10.7	11.8
1979	7.5	12.0	11.1	16.9
1980	6.7	12.9	9.5	19.4
1981	7.4	12.2	10.5	18.0
1982	5.3	5.0	6.7	6.1
1983	6.3	(9.6)	7.9	(8.7)
1984	7.1	(3.2)	8.9	(3.4)
1985	5.9	(0.6)	7.1	(0.7)
1986	5.8	(0.6)	6.5	(b)
1987	7.2(a)	1.7	8.0(a)	2.1
1988	8.3(a)	2.1	9.5(a)	2.5
1989	6.9(a)	2.7	7.8(a)	4.6
1990	6.1	2.7	6.2	3.9
1991	3.6	3.2	3.7	3.8

Sources: U.S. Department of Commerce, Bureau of the Census, "Quarterly Financial Report for Manufacturing Corporations" and AMT

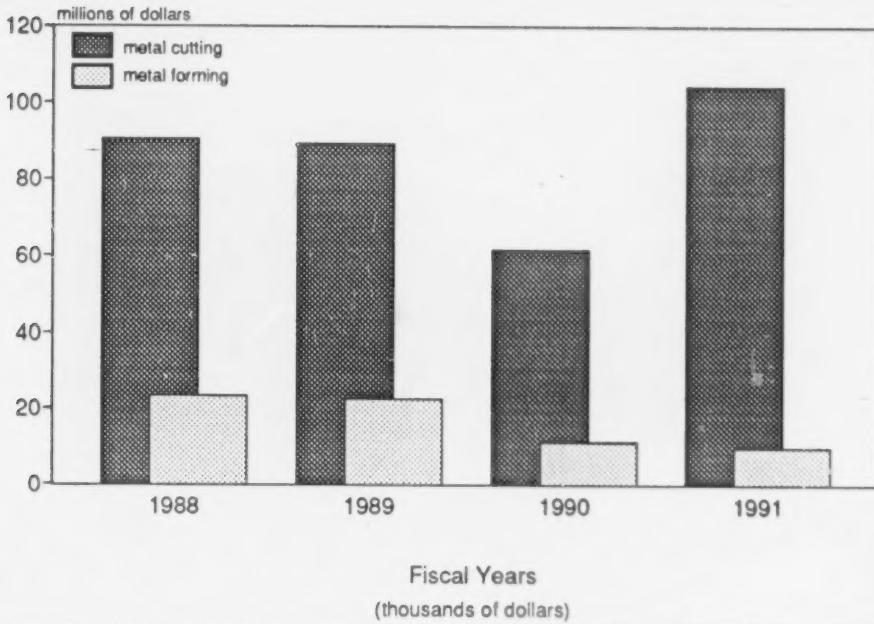
Note: (a) - Excludes corporations with less than \$250,000 in assets, (b) - Net income before taxes was less than 0.1%

SELECTED INDUSTRIES

Financial Ratios 1991

	Net operating income to net sales	Income after taxes to net sales	Income after taxes to total assets	Income after taxes to average net worth	Depreciation & amortization to net sales	Inventory turnover	Current assets to current liabilities
Machine Tools	4.3%	1.7%	1.9%	3.8%	2.6%	3.4x	2.0x
All Manufacturing	4.9	2.5	2.6	6.5	4.1	7.0	1.4
Durable Goods	2.8	0.6	0.6	1.4	4.0	5.7	1.5
Primary Iron & Steel	0.7	-2.8	-3.2	-18.9	3.8	5.7	1.6
Primary Nonferrous Metals	4.4	1.5	1.6	3.6	4.1	7.2	1.7
Electrical and Electronic Equip.	6.0	2.2	2.3	5.3	3.7	5.3	1.4
Machinery, except Electrical	1.2	-1.0	-0.9	-1.7	4.8	5.8	2.1
Motor Vehicles and Equip.	-6.3	-4.0	-3.9	-10.9	4.7	12.5	1.3
Transportation Equip.	-1.2	-1.5	-1.5	-4.4	4.1	5.0	1.3
Stone, Clay and Glass	3.5	-3.3	-2.9	-9.5	4.9	7.7	1.2
Nondurable Goods	6.9	4.3	4.4	11.1	4.2	9.1	1.3
Food and Kindred Products	8.4	2.4	3.1	11.6	2.5	9.1	1.3
Textile Mill Products	5.8	1.1	1.5	4.2	3.8	6.9	2.0
Paper and Allied Products	7.1	2.1	11.1	5.1	5.2	8.9	1.5
Chemicals and Allied Products	8.6	7.1	5.9	14.6	4.6	7.2	1.3
Petroleum and Coal	3.7	3.8	3.3	7.8	6.3	14.3	1.0
Rubber and Misc.	4.4	1.0	1.4	3.9	3.7	7.1	1.3

Sources: U.S. Department of Commerce, Bureau of the Census, "Quarterly Financial Report for Manufacturing Corporations" and AMT



	1988	1989	1990	1991
Saws and filing machines	\$ 4,087	\$ 1,831	\$ 3,671	\$ 1,141
Machining centers and way type machines	16,333	5,264	17,548	65,451
Electrical and ultrasonic erosion machines	1,187	2,303	538	445
Boring machines	323	28,676	4,035	1,615
Broaching machines	117	117	38	2,055
Drilling machines and tapping machines	9,969	2,271	2,546	1,036
Gear cutting and finishing machines	1,307	939	432	478
Grinding machines	18,149	16,776	6,916	8,232
Lathes	17,052	17,275	17,512	10,222
Milling machines	13,575	9,739	4,674	6,751
Planers and shapers	2,509	425	0	207
Misc. machine tools	6,109	3,777	3,671	6,820
TOTAL METAL CUTTING MACHINE TOOLS	90,717	89,393	61,581	104,453
Bending and forming machines	4,590	9,246	5,382	2,557
Hydraulic and pneumatic presses	4,718	507	431	771
Mechanical presses, power driven	3,345	3,107	709	940
Manual presses	392	132	342	183
Punching and shearing machines	7,920	8,282	4,114	1,765
Forging machinery and hammers	924	553	198	2,298
Wire and metal ribbon forming machines	200	40	0	0
Riveting machines	314	387	101	57
Misc. secondary forming & cutting mach.	1,038	404	61	1,293
TOTAL METAL FORMING MACHINE TOOLS	23,441	22,658	11,338	9,864
TOTAL MACHINE TOOLS	114,158	112,051	72,919	114,317

Source: Department of Defense, OASD (Comptroller), "Military Prime Contract Awards, by Service Category and Federal Supply Classification"

MACHINE TOOLS

Producer Price Indexes

(1982 = 100)

Year	All Machine Tools	Metal Cutting	Metal Forming
1961	20.9	21.4	19.6
1962	21.4	21.8	20.1
1963	21.4	21.9	20.2
1964	22.3	22.8	20.9
1965	23.5	24.0	22.1
1966	25.0	25.5	23.6
1967	26.5	27.1	24.7
1968	27.5	28.0	25.7
1969	28.4	29.0	26.5
1970	30.1	30.8	28.6
1971	31.2	31.8	29.9
1972	32.1	32.6	31.0
1973	34.3	34.8	32.9
1974	40.9	41.2	40.0
1975	48.0	48.1	47.5
1976	52.0	51.8	52.6
1977	56.4	56.0	57.5
1978	63.4	62.8	64.9
1979	72.8	72.4	74.2
1980	85.2	85.1	85.7
1981	93.7	93.6	94.0
1982	100.0	100.0	100.0
1983	102.3	102.1	102.7
1984	104.7	104.7	104.7
1985	107.2	107.3	107.0
1986	109.4	109.6	108.7
1987	111.9	112.6	110.2
1988	115.9	117.4	113.2
1989	122.0	123.4	118.1
1990	129.5	129.8	128.7
1991	134.3	134.1	132.7

Sources: U.S. Department of Labor, Bureau of Labor Statistics; AMT

Note: The index for all machine tools is an average of the cutting and forming index, weighted by AMT shipment data.

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DISTRIBUTION OF MACHINE TOOLS IN U.S. METALWORKING INDUSTRIES

Geographical
1989



Area	METAL CUTTING		METAL FORMING	
	Number	% of total in area	Number	% of total in area
1. Boston	104,799	5.6	23,414	5.1
2. Bridgeport-Hartford	57,266	3.1	13,681	3.0
3. New York-Newark	63,751	3.4	15,605	3.4
4. Buffalo-Syracuse	54,438	2.9	12,919	2.8
5. Philadelphia-Camden	140,483	7.5	37,566	8.2
6. Pittsburgh-Wheeling	42,347	2.3	8,176	1.8
7. Baltimore	15,956	0.9	3,944	0.9
8. Richmond-Charlotte	87,056	4.7	22,605	5.0
9. Atlanta-New Orleans	146,313	7.8	39,049	8.6
10. Cleveland	69,070	3.7	15,521	3.4
11. Toledo	21,653	1.2	5,997	1.3
12. Cincinnati-Louisville	65,054	3.5	14,792	3.2
13. Detroit	89,230	4.8	17,687	3.9
14. Indianapolis	45,786	2.4	10,450	2.3
15. Chicago	214,174	11.4	54,059	11.9
16. Milwaukee	67,795	3.6	17,777	3.9
17. Minneapolis-St. Paul	45,362	2.4	12,281	2.7
18. St. Louis	60,185	3.2	17,068	3.7
19. Kansas City-Tulsa	45,455	2.4	10,099	2.2
20. Dallas-Houston	94,821	5.1	21,436	4.7
21. Denver	43,379	2.3	10,129	2.2
22. Seattle-Portland	40,712	2.2	8,602	1.9
23. San Francisco	71,579	3.8	20,065	4.4
24. Los Angeles	184,089	9.8	43,106	9.5
Total	1,870,753	100.0	456,028	100.0

Source: American Machinist 14th Inventory

**DISTRIBUTION OF MANUFACTURING TECHNOLOGY
IN U.S. METALWORKING INDUSTRIES**

**Age of Machine
1989**

Type of equipment	Total Units	0-4 Years	5-9 Years	10-19 Years	20+ Years
METAL CUTTING MACHINES	1,870,753	292,163	449,681	640,864	488,045
NC Turning Machines	74,077	30,949	26,048	14,999	2,081
Non-NC Turning Machines	330,357	28,526	52,497	121,836	127,498
NC Boring Machines	10,688	2,917	3,376	3,039	1,356
Non-NC Boring Machines	37,372	2,688	6,239	14,449	13,996
NC Drilling Machines, all types	10,383	2,921	2,823	3,459	1,180
Non-NC Drilling Machines	274,623	31,103	60,017	100,811	82,692
NC Machining Centers (w/ATC)	53,585	23,813	19,548	8,729	1,495
NC Milling Machines	28,260	10,064	11,357	5,771	1,068
Non-NC Milling Machines	220,846	27,354	53,609	82,484	57,399
NC Gear Cutting Machines	804	443	98	89	174
Non-NC Gear Cutting & Finishing Machines	28,705	911	1,994	10,553	15,247
NC Grinding Machines	12,747	5,285	3,341	3,111	1,010
Non-NC Grinding Machines	422,100	57,791	104,487	148,143	111,679
Honing, Lapping, Polishing Machines	48,537	5,157	13,369	19,727	10,284
Station-type Metal Cutting Machines	13,250	1,799	3,936	5,484	2,031
Broaching Machines, All Types	16,698	1,785	2,645	5,335	6,933
Tapping Machines	31,950	4,285	10,323	10,511	6,831
Threading Machines (not mill, grind, roll)	9,533	1,218	1,428	3,462	3,425
Cutoff & Sawing Machines	204,654	40,900	60,754	67,147	35,853
Waterjet Machines	1,255	178	207	850	20
NC Laser & Thermal Cutting Machines	4,467	2,550	1,329	483	105
Non-NC Thermal Cutting Mach. (incl plasma)	6,173	2,812	1,359	1,468	534
Electrical Machining Units	19,036	5,894	6,340	5,502	1,300
All Other NC Metal Cutting Machines	2,061	289	708	722	342
All Other Non-NC Metal Cutting Machines	8,592	531	1,849	2,700	3,512
METAL FORMING MACHINE TOOLS	456,028	51,593	94,847	171,002	138,586
NC Punching & Shearing Machines	9,830	4,015	3,440	2,014	361
Non-NC Punching & Shearing Machines (power)	76,260	8,965	15,188	29,061	23,046
NC Bending & Forming Machines, All Types	7,195	3,118	2,386	1,183	508
Non-NC Bending & Forming Mach. (power)	81,608	8,177	18,435	32,995	22,001
Mechanical Presses (power)(not forge)	150,570	9,870	21,426	61,046	58,228
Hydraulic Presses (not forge)	49,691	7,406	13,635	17,957	10,693
Pneumatic Presses	24,889	3,960	9,031	7,953	3,945
Coil-processing Systems	13,333	1,295	3,454	5,031	3,553
Sheet- and Plate-processing Systems	1,321	242	475	369	235
Forging Machines	15,736	1,266	1,776	3,992	8,702
Die Casting Machines (hot & cold chamber)	3,179	421	1,124	1,004	630
Multiple-slide Forming Machines	6,525	913	1,310	2,398	1,904
Threadrolling Machines	6,902	729	968	2,521	2,684
All Other NC Metal Forming Machines	863	381	175	166	141
All Other Non-NC Metal Forming Machines	8,126	835	2,024	3,312	1,955
<i>continued</i>					

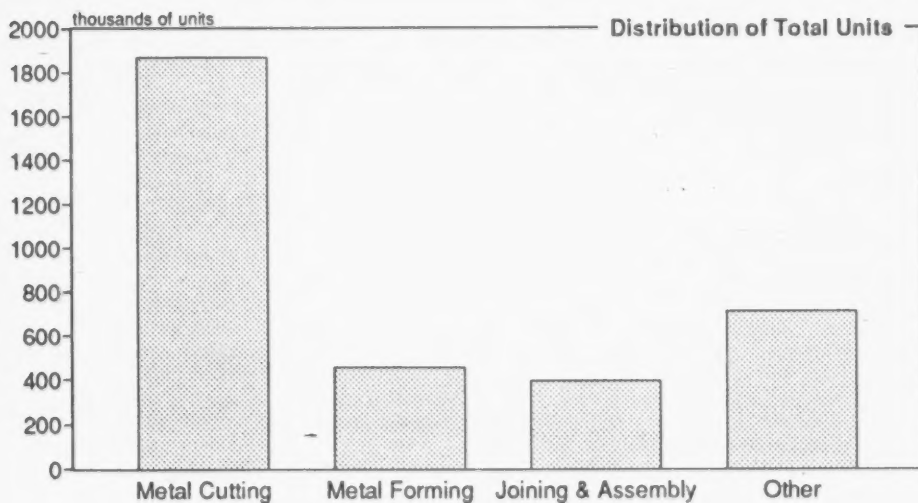
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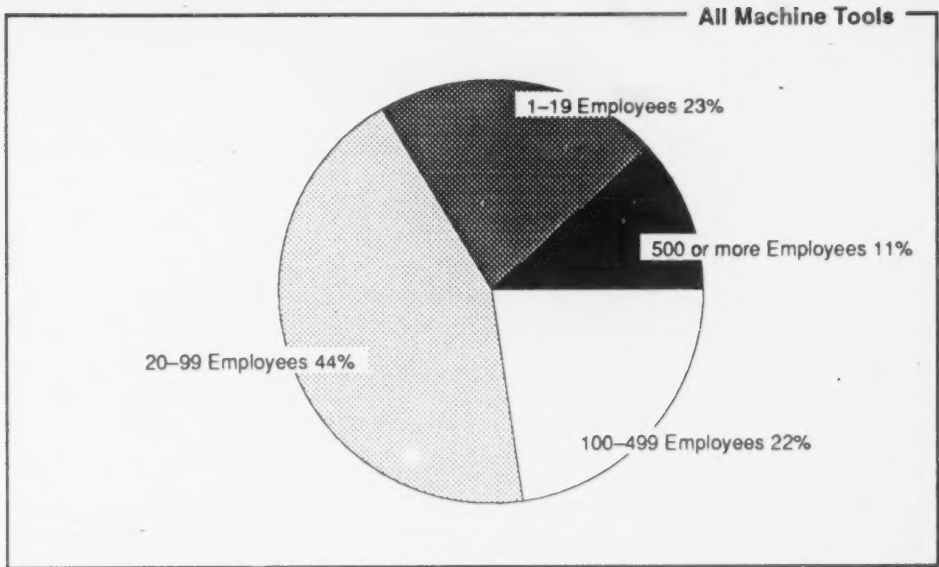
**DISTRIBUTION OF MANUFACTURING TECHNOLOGY
IN U.S. METALWORKING INDUSTRIES**

**Age of Machine
1989**
(continued)

Type of equipment	Total Units	0-4 Years	5-9 Years	10-19 Years	20+ Years
JOINING & ASSEMBLY EQUIPMENT	395,273	83,208	135,951	122,287	53,827
Auto Assembly Machines	21,718	7,875	7,233	4,409	2,201
Riveting Machines (not portable)	26,792	3,467	6,874	10,489	5,962
Electric Arc Welding Equipment	245,733	54,113	92,722	75,247	23,651
Electric Resistance Welding Equipment	64,911	9,885	16,058	21,324	17,644
Energy Beam Welding	1,454	623	321	467	43
Gas Welding Machines (not hand)	7,116	1,750	2,716	2,137	513
Brazing Systems (all types, incl. furnaces)	20,092	3,654	7,264	5,778	3,396
Metallizing Equipment (gas & plasma)	7,457	1,841	2,763	2,436	417
OTHER EQUIPMENT	712,217	349,926	198,763	116,624	46,904
Plastic Molding Machines	25,725	5,652	8,114	8,928	3,031
Inspection & Measuring Machines	98,533	28,701	34,736	25,844	9,252
Heat Treating Equipment	47,845	7,470	11,442	17,956	10,977
Baking & Drying Ovens	45,426	9,512	15,456	15,342	5,116
Cleaning & Finishing Equipment	152,102	36,828	53,859	44,197	17,218
Robots	13,126	7,984	4,023	682	437
Computer Workstations	329,460	253,779	71,133	3,675	873

Source: American Machinist 14th Inventory





Type of equipment	Total Units	# of Employees			
		1-19	20-99	100-499	500 or more
TOTAL METAL CUTTING MACHINES	1,870,753	23%	45%	21%	11%
NC turning machines	74,077	16	42	26	16
Non-NC turning machines	330,357	22	45	21	11
NC boring machines	10,688	13	32	29	26
Non-NC boring machines	37,372	20	47	21	12
NC drilling machines	10,383	19	39	28	15
Non-NC drilling machines	274,623	24	45	21	11
NC machining centers	53,585	16	50	22	11
NC milling machines	28,260	26	42	15	17
Non-NC milling machines	220,846	25	48	19	8
NC gear-cutting machines	804	22	21	45	12
Non-NC gear cut & finish machines	28,705	13	50	31	6
NC grinding machines	12,747	21	37	24	17
Non-NC grinding machines	422,100	24	44	22	10
Honing, lapping, polishing machines	48,537	20	43	22	14
Station-type metal cutting machines	13,250	17	21	20	43
Broaching machines	16,698	16	46	24	15
Tapping machines	31,950	29	43	20	7
Threading machines	9,533	23	47	22	8
Cutoff & sawing machines	204,654	28	43	18	10
Waterjet machines	1,255	7	73	9	10
NC laser and thermal cutting units	4,467	27	40	25	8
Non-NC thermal cutting machines	6,173	23	57	15	5
Electrical machining units	19,036	22	42	17	20
Other NC metal cutting machines	2,061	11	37	41	11
Other non-NC metal cutting machines	8,592	22	42	36	0

(continued)

E

**DISTRIBUTION OF MANUFACTURING TECHNOLOGY
IN U.S. METALWORKING INDUSTRIES**

**Plant Size
1989**
(continued)

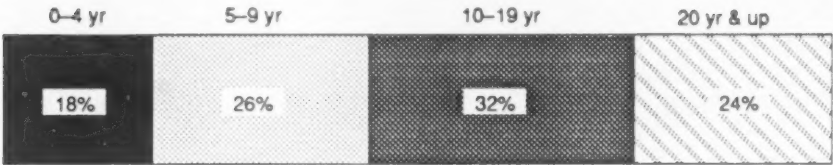
Type of equipment	# of Employees				
	Total Units	1-19	20-99	100- 499	500 or more
TOTAL METAL FORMING MACHINES	456,028	23%	41%	26%	10%
NC punching & shearing machines	9,830	21	40	25	14
Non-NC punching & shearing machines	76,260	27	45	20	8
NC bending & forming machines	7,195	16	46	20	18
Non-NC bending & forming machines	81,608	27	42	21	11
Mechanical presses	150,570	22	40	29	9
Hydraulic presses	49,691	25	41	25	9
Pneumatic presses	24,889	25	41	25	10
Coil-processing systems	13,333	25	36	27	12
Sheet- & plate-processing systems	1,321	21	21	42	16
Forging machines	15,736	10	31	34	25
Die casting machines	3,179	26	31	34	9
Multiple-slide forming machines	6,525	19	52	21	8
Thread-rolling machines	6,902	8	43	34	15
Other NC metal forming machines	863	43	31	20	6
Other non-NC metal forming machines	8,126	18	34	41	7
Total NC cutting machines	204,468	18	43	23	16
Total NC forming machines	17,888	20	42	23	15
Total NC machine tools	222,356	18	43	23	16
TOTAL MACHINE TOOLS	2,326,781	23	44	22	11
TOTAL JOINING & ASSEMBLY EQUIPMENT	395,273	20	42	27	11
Automatic assembly machines	21,718	9	25	43	23
Riveting machines	26,792	12	35	40	13
Electric Arc Welding Equipment	245,733	21	47	25	7
Electric Resistance Welding Equipment	64,911	21	35	26	19
Energy beam welding	1,454	11	19	27	43
Gas welding machines	7,116	24	35	31	10
Brazing systems	20,092	25	36	31	8
Metallizing equipment	7,457	24	37	18	21
OTHER EQUIPMENT	712,217	12	29	23	36
Plastic molding machines	25,725	14	34	42	11
Inspection & measuring machines	98,533	16	40	28	16
Heat treating equipment	47,845	14	37	27	22
Baking & drying ovens	45,426	14	36	34	15
Cleaning & finishing equipment	152,102	21	40	26	13
Robots	13,126	13	36	28	24
Computer workstations	329,460	6	18	17	59

Source: American Machinist 14th Inventory

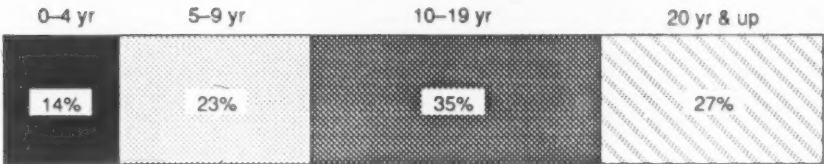
DISTRIBUTION OF MANUFACTURING TECHNOLOGY
IN U.S. METALWORKING INDUSTRIES

*Age of Machine
and Plant Size, 1989*

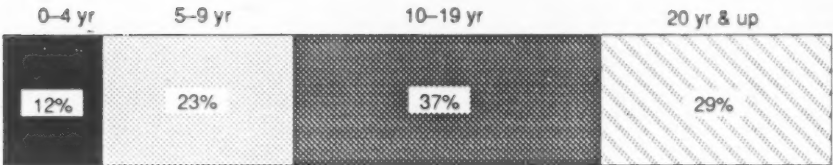
1-19 Employees



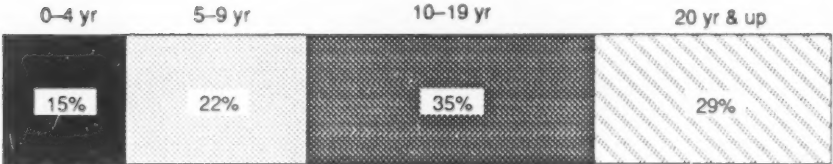
20-99 Employees



100-499 Employees



500 or More Employees



E

**DISTRIBUTION OF MANUFACTURING TECHNOLOGY
IN U.S. METALWORKING INDUSTRIES**

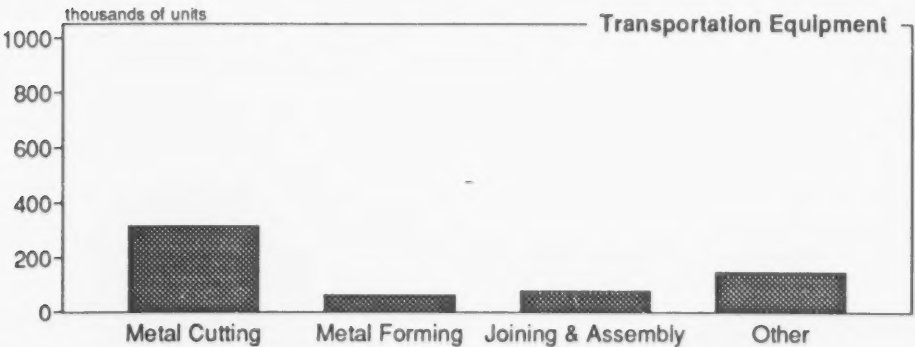
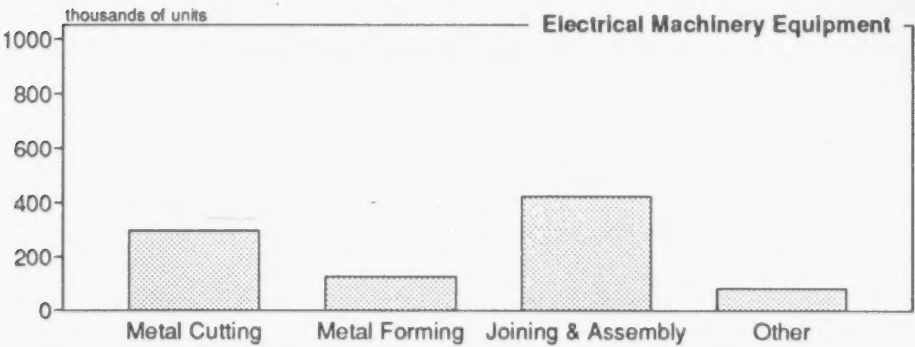
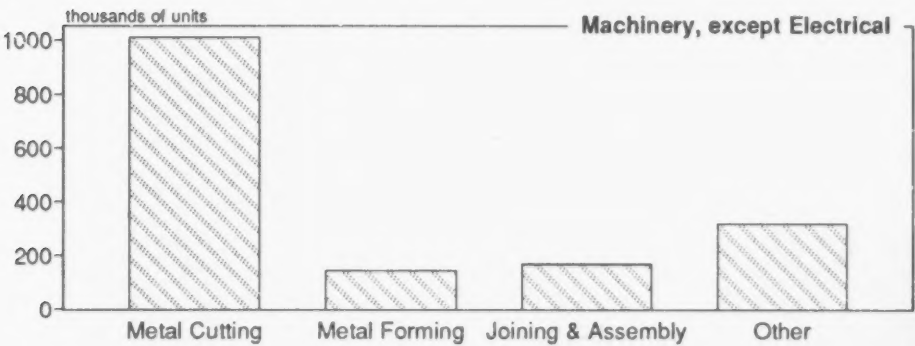
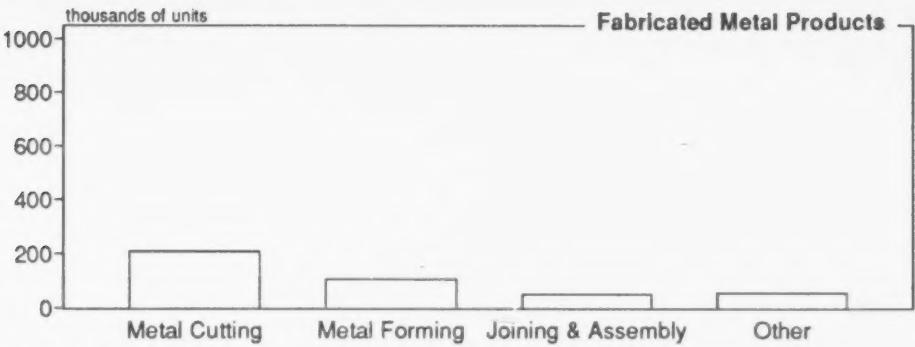
**Age of Machine
and Plant Size, 1989**

Type of equipment	Total Units	0-4 yr	5-9 yr	10-19 yr	20 yr & up
Plants with 1-19 employees					
Total metal cutting machines	433,902	20%	26%	31%	24%
Total metal forming machines	106,576	13	27	36	24
Total NC cutting machines	36,430	44	34	17	4
Total NC forming machines	3,575	50	31	14	4
Total NC machine tools	40,005	45	34	17	4
Total machine tools	540,478	18	26	32	24
Total joining & assembly	78,646	27	30	30	13
Total other equipment	86,027	39	32	20	9
Total equipment	705,151	22	27	30	21
Plants with 20-99 employees					
Total metal cutting machines	833,994	15%	24%	35%	26%
Total metal forming machines	186,612	11	19	37	33
Total NC cutting machines	88,346	39	35	22	4
Total NC forming machines	7,559	44	29	21	6
Total NC machine tools	95,905	40	35	21	4
Total machine tools	1,020,606	14	23	35	27
Total joining & assembly	166,914	21	34	32	13
Total other equipment	208,037	41	29	22	9
Total equipment	1,395,557	19	25	33	23
Plants with 100-499 employees					
Total metal cutting machines	396,818	13%	24%	36%	27%
Total metal forming machines	116,760	10	20	42	29
Total NC cutting machines	47,767	37	35	22	6
Total NC forming machines	4,056	31	43	20	6
Total NC machine tools	51,823	37	36	21	6
Total machine tools	513,578	12	23	37	28
Total other equipment	164,524	38	34	22	7
Total equipment	786,271	18	27	33	21
Plants with 500 or more employees					
Total metal cutting machines	206,039	15%	23%	36%	26%
Total metal forming machines	46,080	12	16	31	41
Total NC cutting machines	31,925	43	34	21	2
Total NC forming machines	2,698	42	37	17	5
Total NC machine tools	34,623	43	34	21	2
Total machine tools	252,119	15	22	35	29
Total joining & assembly	41,544	16	30	32	23
Total other equipment	253,629	67	22	8	4
Total equipment	547,292	39	23	22	17

Source: American Machinist 14th Inventory

**DISTRIBUTION OF MANUFACTURING TECHNOLOGY
IN U.S. METALWORKING INDUSTRIES**

*Machine Category
by Industry, 1989*



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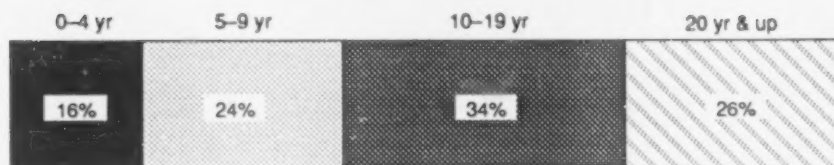
**DISTRIBUTION OF MANUFACTURING TECHNOLOGY
IN U.S. METALWORKING INDUSTRIES**

**Machine Category
by Industry, 1989**

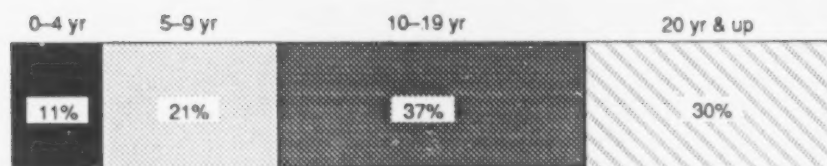
SIC	Industry	Metal Cutting	Metal Forming	Joining & Assembly	Other Equipment
25	METAL FURN, FIXTURES	6,043	5,186	4,182	2,199
33	PRIMARY METALS	5,957	2,174	1,205	2,350
34	FABRICATED METAL PRODUCTS	210,863	109,836	54,090	58,129
341	Cans & Shipping Containers	2,019	2,013	1,105	888
342	Cutlery, handtools, hdw	28,183	12,838	6,416	7,670
343	Heating, plumbing fxts	4,776	2,212	1,192	1,405
344	Fab Structural metal pdts	55,706	36,036	27,306	11,585
345	Screw Machine Products	37,731	11,127	1,590	8,107
346	Metal Stampings	31,240	28,492	6,530	10,243
347	Coating and Engraving	5,532	770	1,147	3,961
348	Ordinance accessories	3,524	565	426	1,004
349	Misc fab metal products	39,369	15,266	7,967	10,865
35	MACHINERY EXCEPT ELECTRICAL	1,011,582	145,427	170,148	319,780
351	Engines and turbines	10,146	1,138	1,133	4,062
352	Farm, garden machinery	33,999	12,873	18,563	13,332
353	Construction, mining, matl hdg	77,443	15,846	33,561	18,291
354	Metalworking machinery	221,868	18,955	13,163	39,717
355	Special industry machinery	103,958	13,161	16,112	18,868
356	General industrial machinery	154,921	21,780	24,500	41,730
357	Office, computing machinery	64,036	10,625	12,445	31,902
358	Refrigeration service machinery	49,120	16,431	14,889	8,433
359	Misc machinery, except elec	239,859	19,938	21,690	37,247
36	ELECTRICAL MACHINERY, EQUIP.	298,464	126,744	425,208	83,746
361	Transformer, distribution equipment	23,851	9,938	6,430	7,032
362	Elec industrial apparatus	48,799	13,855	10,481	19,936
363	Household appliances	12,052	11,214	7,714	8,282
364	Electric lighting, wiring	34,219	14,670	7,865	15,172
365	Radio, TV equipment	33,602	33,495	12,150	10,609
366	Communications equipment	41,444	11,543	9,567	48,585
367	Electronic Components	60,044	19,457	11,887	37,711
369	Misc electrical equipment	26,102	9,702	8,765	13,569
37	TRANSPORTATION EQUIPMENT	315,648	63,345	77,893	148,336
371	Motor vehicles and parts	115,141	31,198	33,414	29,582
372	Aircraft and parts	130,962	17,953	15,638	97,368
373	Ships and boats	28,760	7,882	18,181	8,351
374	Railroad equipment	13,505	1,417	2,383	2,212
375	Mtrcycles, bicycles, parts	1,699	1,329	1,017	866
376	Guided missiles, space veh	5,361	452	686	2,057
379	Misc transportation equipment	6,406	996	2,049	740
38	PRECISION INSTRUMENTS	20,715	2,967	2,937	11,947
39	MISC MFG INDUSTRIES	1,481	349	442	1,521
	TOTAL	1,870,753	456,028	395,273	712,217

Source: American Machinist 14th Inventory

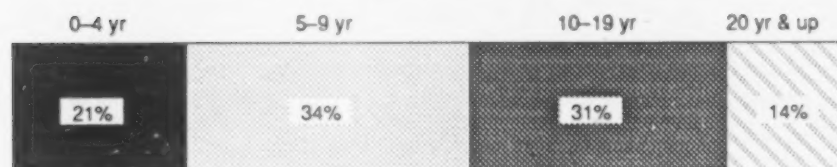
Metal Cutting Machine Tools in Use, 1989



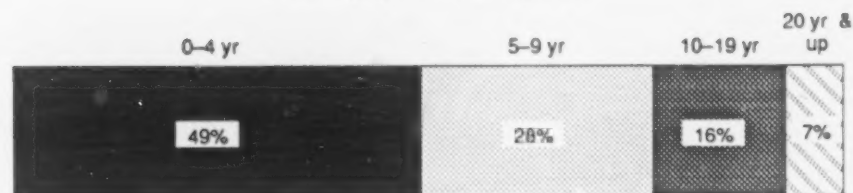
Metal Forming Machine Tools in Use, 1989



Joining & Assembly Machines in Use, 1989



Other Equipment in Use, 1989



**DISTRIBUTION OF MANUFACTURING TECHNOLOGY
IN U.S. METALWORKING INDUSTRIES**

*Age and Type of Machine
by Industry, 1989*

SIC	Industry	Total Units	0-4 yr	5-9 yr	10-19 yr	20 yr & up
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Metal Cutting Machine Tools In Use, 1989

25	Metal furn, fixtures	6,043	1%	2%	76%	21%
33	Primary metals	5,957	14	21	32	33
34	Fabricated metal products	210,863	15	22	34	29
35	Machinery, except electrical	1,011,582	15	24	34	27
36	Electrical machinery, equipment	298,464	19	27	34	20
37	Transportation equipment	315,648	15	24	35	26
38	Precision instruments	20,715	14	31	32	24
39	Misc mfg industries	1,481	16	14	50	20
	Total	1,870,753	16	24	34	26

Metal Forming Machine Tools In Use, 1989

25	Metal furn, fixtures	5,186	3%	2%	66%	29%
33	Primary metals	2,174	7	21	54	19
34	Fabricated metal products	109,836	10	16	40	35
35	Machinery, except electrical	145,427	13	21	35	31
36	Electrical machinery, equipment	126,744	13	26	37	24
37	Transportation equipment	63,345	8	20	36	36
38	Precision instruments	2,967	5	34	37	24
39	Misc mfg industries	349	5	6	42	47
	Total	456,028	11	21	37	30

Joining and Assembly Machines In Use, 1989

25	Metal furn, fixtures	4,812	1%	5%	22%	73%
33	Primary metals	1,205	20	34	43	2
34	Fabricated metal products	54,090	20	31	33	16
35	Machinery, except electrical	170,148	21	36	32	11
36	Electrical machinery, equipment	83,746	24	33	28	41
37	Transportation equipment	77,893	19	38	30	13
38	Precision instruments	2,937	15	39	33	13
39	Misc mfg industries	442	15	25	43	17
	Total	395,273	21	34	31	14

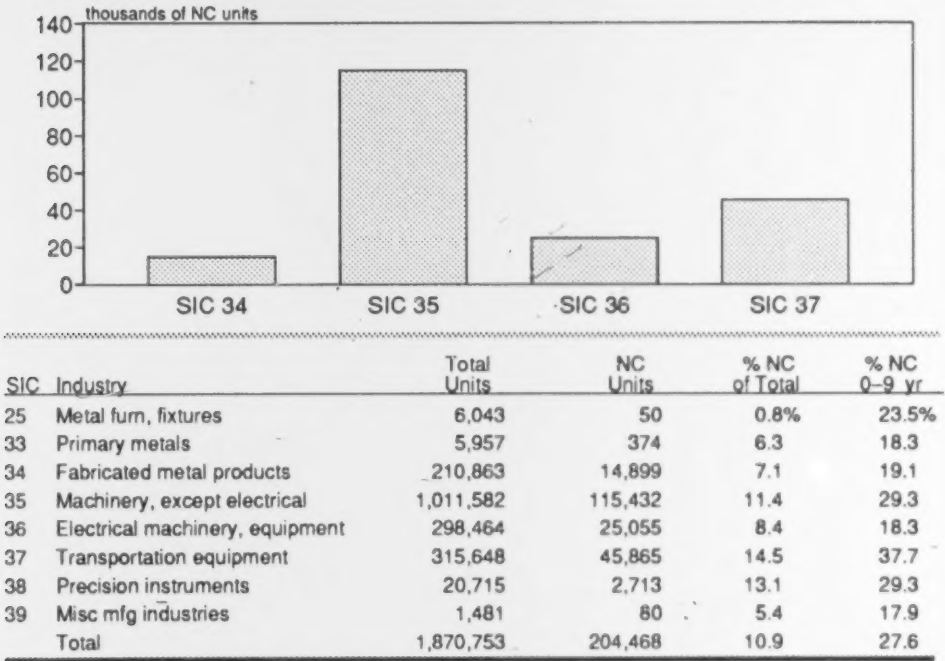
Other Equipment In Use, 1989

25	Metal furn, fixtures	2,129	11%	66%	6%	16%
33	Primary metals	2,350	27	23	22	27
34	Fabricated metal products	58,129	33	27	27	13
35	Machinery, except electrical	319,780	53	27	14	6
36	Electrical machinery, equipment	168,025	39	36	19	7
37	Transportation equipment	148,336	62	19	14	5
38	Precision instruments	11,947	30	50	16	4
39	Misc mfg industries	1,521	56	18	22	5
	Total	712,217	49	28	16	7

Source: American Machinist 14th Inventory

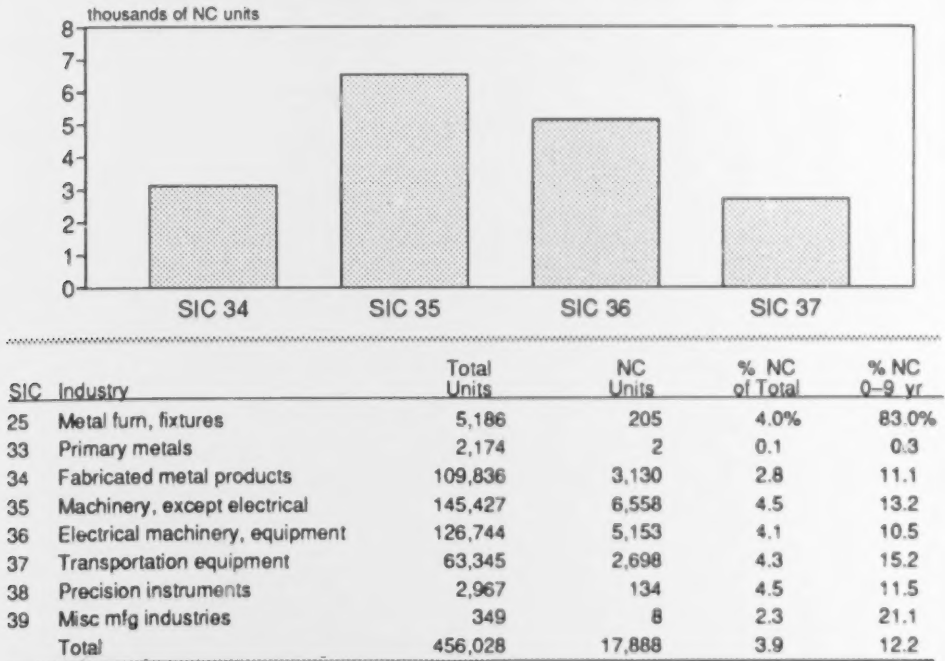
DISTRIBUTION OF NUMERICALLY CONTROLLED
MACHINE TOOLS IN U.S. METALWORKING INDUSTRIES

Metal Cutting
1989



DISTRIBUTION OF NUMERICALLY CONTROLLED
MACHINE TOOLS IN U.S. METALWORKING INDUSTRIES

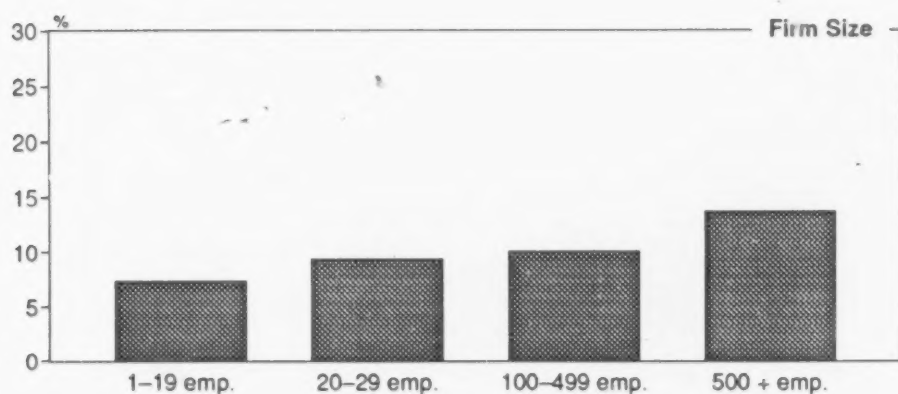
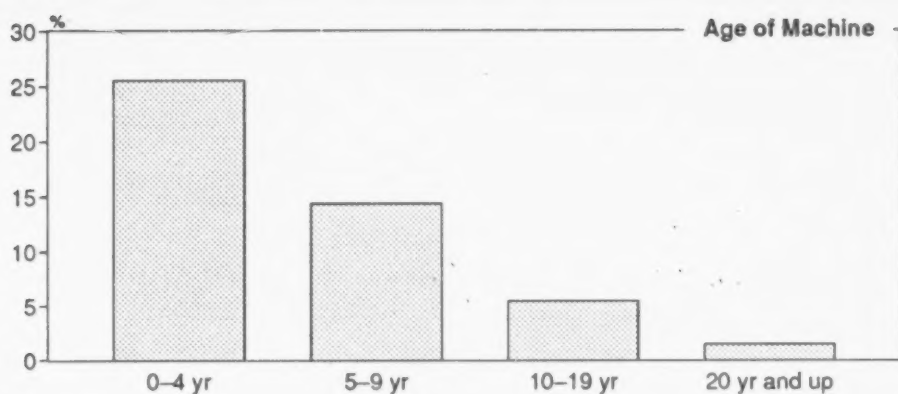
Metal Forming
1989



Source: American Machinist 14th Inventory

**DISTRIBUTION OF NUMERICALLY CONTROLLED
MACHINE TOOLS IN U.S. METALWORKING INDUSTRIES**

**Age of Machine
and Firm Size, 1989**



Size of Firm (# of Employees)	% of All Machines	0-4 yrs	5-9 yrs	10-19 yrs	20 yrs and up
1 - 19	7.4%	18.1%	9.7%	4.0%	1.3%
20 - 29	9.4	26.0	14.3	5.7	1.5
100 - 499	10.1	30.3	15.8	5.8	2.3
500 +	13.7	40.7	21.6	8.1	1.1
All Firms	9.6	25.6	14.4	5.5	1.5

Source: American Machinist 14th Inventory

Contents

International Machine Tool Statistics

Section F

Note: Foreign data in this section have been converted into U.S. dollars based on annual average exchange rates. However, because the value of the dollar has risen and fallen sharply in recent years, dollar-denominated figures may show declines (increases) when national currency figures reflect increases (declines). Therefore, when analyzing long term trends it might be advisable to convert dollar-denominated statistics back into national currency terms.

Unless otherwise noted, "Germany" in this section refers to old "West Germany."

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(millions of U.S. dollars)

	PRODUCTION			TRADE		
	Total	Cutting	Forming	Export	Import	Consumption
1. Japan	\$11,632.3	\$9,395.0	\$2,237.3	\$3,975.4	\$633.9	\$8,290.8
2. Germany	8,813.0	6,169.0	2,644.0	5,103.8	2,308.2	6,017.4
3. Italy	3,470.1	2,517.2	952.9	1,624.7	872.9	2,718.3
4. United States	3,265.9	2,254.9	1,011.1E	896.9	1,971.0	4,340.1
5. USSR (c,d)	2,500.0	2,000.0	500.0	100.0	1,000.0	3,400.0
6. Switzerland	2,027.2	1,611.6	415.6	1,730.2	422.7	719.7
7. China	1,445.8	1,108.0	337.8	201.8	524.0	1,768.0
8. United Kingdom	1,288.1	950.7E	337.4E	727.5	798.4	1,359.0
9. Taiwan	962.6	681.3	281.3	624.9	289.4	627.1
10. France	923.6	609.3E	314.3E	442.4	1,345.5	1,826.7
11. South Korea	798.4	659.3	139.1	95.4	940.9	1,643.9
12. Spain	750.6	507.0	244.0	370.1	422.8	803.4
13. Yugoslavia (d)	375.0	247.6	127.4	218.5	75.8	232.3
14. Romania (c,d)	350.0	300.0	50.0	100.0	60.0	310.0
15. Brazil (d)	350.0	315.0	35.0	54.0	135.6E	431.6
16. Austria	315.0	283.6E	61.4E	318.1	384.2	411.1
17. Canada (d)	300.9	178.7	122.3	79.7	349.1	570.3
18. Belgium (d)	259.0	31.2	227.8	448.8	504.6	314.8
19. Sweden (d)	231.4	115.7	115.7	239.5	252.8	244.7
20. India (d)	202.7	178.2	24.5	25.0	100.3	278.0
21. Czechoslovakia (c,d)	141.8	105.7	36.1	138.7	97.4	100.5
22. Poland (c,d)	124.3	96.1	28.2	27.0	128.1E	225.4
23. Bulgaria (c)	120.0E	108.0E	12.0E	40.0E	20.0E	100.0E
24. Netherlands	113.9	41.9	72.0	174.6	359.8	299.2
25. Singapore (d)	113.0	104.0	8.9	56.7	298.8	355.1
26. Denmark (d)	74.1	34.5	39.6	82.9	127.5	118.7
27. Hungary (c)	73.0E	57.2E	16.0E	59.0E	73.8E	87.8E
28. Finland (d)	45.1	8.6	36.5	35.8	98.6	108.0
29. Argentina	32.6	21.5	11.1	14.2	86.2	104.6
30. Portugal (d)	29.0	6.4	22.5	17.4	111.9	123.5
31. Hong Kong (d)	15.5	7.7	7.7	167.7	164.4	12.2
32. Mexico (c,d)	15.0	10.0	5.0	10.0	250.0	255.0
33. Australia (c,d)	14.0	10.0	4.0	7.0	75.0	82.0
34. South Africa (d)	7.3	1.5	5.8	0.4	49.0	55.9
TOTAL	41,210.2	30,726.4	10,484.3	18,208.1	15,332.6	38,334.7

Sources: National machine tool trade associations or government sources; American Machinist

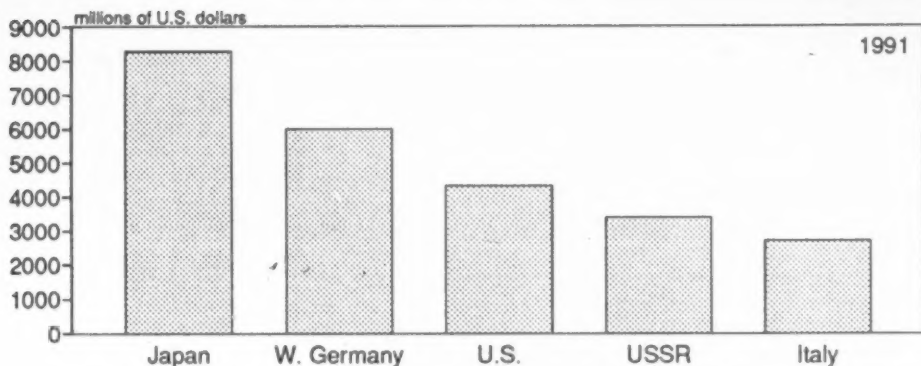
Note: Whenever possible, data include new, complete machine tools only, excluding parts and accessories. Figures for Germany include East Germany. c = rough estimate based on fragmentary data; d = American Machinist estimates, with the following exceptions: imports and exports for Argentina, Canada, Sweden; E = estimated by AMT

(millions of U.S. dollars)

	PRODUCTION			TRADE		
	Total	Cutting	Forming	Export	Import	Consumption
1. Japan	\$10,946.1	\$9,002.0	\$1,944.1	\$3,979.8	\$652.0	\$7,618.3
2. West Germany	8,733.9	6,238.6	2,495.3	5,016.4	2,131.8	5,849.3
3. USSR (c,d)	4,000.0	3,000.0	1,000.0	300.0	2,000.0	5,700.0
4. Italy	3,705.9	2,662.5	1,043.3	1,740.0	1,054.3	3,020.2
5. United States	3,382.1	2,339.4	1,042.7	908.3	2,147.9	4,621.6
6. Switzerland	2,311.5	1,836.6	474.9	2,016.7	585.9	880.7
7. United Kingdom	1,679.4	1,239.5	439.9	873.6	932.9	1,738.7
8. China	1,173.9	849.8	324.1	221.7	492.8	1,445.0
9. France	1,168.9	885.6	283.4	538.6	1,627.8	2,258.1
10. East Germany (c,d)	1,085.0	875.0	210.0	775.0	290.0	600.0
11. Spain	1,015.4	719.2	296.2	454.0	526.8	1,088.2
12. Taiwan	943.7	682.8	260.9	640.4	294.2	597.5
13. South Korea	785.1	638.1	147.0	86.9	851.1	1,549.3
14. Yugoslavia	630.0	408.2	221.8	464.6	118.0	283.4
15. Romania (c,d)	481.7	420.6	61.1	127.6	78.5	432.6
16. Austria	368.8	289.4	79.4	391.2	372.9	350.5
17. Canada (d)	363.3	224.8	138.5	101.9	437.6	699.0
18. Brazil	301.0	266.0	35.0	37.4	115.6E	379.2
19. Belgium	284.7	34.3	250.4	543.7	601.1	342.2
20. Sweden	255.7	128.3	127.4	289.0	348.1	314.8
21. India	237.3	208.6	28.7	46.2	114.6	305.7
22. Czechoslovakia (c,d)	191.9	143.1	48.8	187.7	158.5	162.7
23. Bulgaria (c,d)	160.0	150.0	10.0	120.0	75.0	115.0
24. Netherlands	140.4	71.6	68.8	182.4	380.2	338.1
25. Poland (c,d)	124.3	96.1	28.2	27.0	216.4E	313.7
26. Singapore (d)	104.6	96.2	8.3	65.1	266.4	305.9
27. Hungary (c,d)	97.8	81.2	16.6	88.0	48.1E	57.9
28. Denmark	80.5	37.2	43.3	95.4	146.0	131.1
29. Finland (d)	50.7	13.6	37.1	37.9	182.3	195.1
30. Argentina	44.8	30.5	14.3	31.7	32.1	45.3
31. Portugal	32.8	7.0	25.9	19.4	125.7	139.1
32. Mexico (d)	21.5	13.9	7.6	10.8	258.0	268.7
33. Hong Kong (d)	17.1	8.6	8.6	136.6	151.8	32.3
34. Australia (d)	15.6	10.9	4.7	7.8	82.6	90.4
35. South Africa (d)	13.5	2.7	10.8	0.4	118.4	131.6
TOTAL	44,948.9	33,711.9	11,237.1	20,563.2	18,015.4	42,401.2

Sources: National machine tool trade associations or government sources; American Machinist

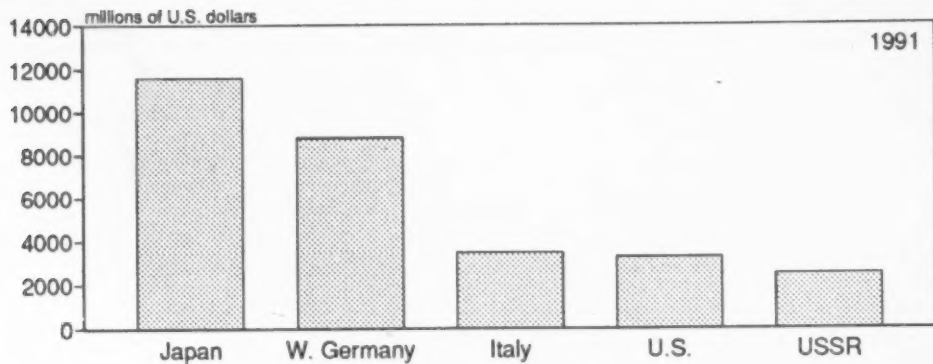
Note: Whenever possible, data include new, complete machine tools only, excluding parts and accessories. c = rough estimate based on fragmentary data; d = American Machinist estimates, with the following exceptions: imports and exports for Canada and Singapore; E = estimated by AMT



	(millions of U.S. dollars)				
	1987	1988	1989	1990	1991
1. Japan	\$3,612.1	\$5,638.0	\$6,638.5	\$7,618.3	\$8,290.8
2. West Germany	4,013.8	3,769.1	4,110.1	5,849.3	6,017.4
3. United States	3,904.2	4,037.8	4,887.4	4,621.6	4,340.1
4. USSR	5,303.2	5,806.0	6,620.0	5,700.0	3,400.0
5. Italy	1,753.2	2,189.4	2,326.8	3,020.2	2,718.3
6. France	1,151.1	1,365.6	1,574.0	2,258.1	1,826.7
7. China	1,033.5	1,190.3	1,163.6	1,445.0	1,768.0
8. South Korea	979.5	1,184.7	1,441.0	1,549.3	1,643.9
9. United Kingdom	1,084.2	1,546.4	1,681.8	1,738.7	1,359.0
10. Spain	606.8	753.6	824.6	1,088.2	803.4
11. Switzerland	576.7	622.5	639.7	880.7	719.7
12. Taiwan	410.9	606.6	727.3	597.5	627.1
13. Canada	708.4	768.9	732.1	699.0	570.3
14. Brazil	612.2	659.4	597.3	379.2	431.6
15. Austria	211.3	288.6	340.7	350.5	411.1
16. Singapore	134.3	189.5	229.8	305.9	355.1
17. Belgium	280.1	276.6	271.7	342.2	314.8
18. Romania (c)	619.4	619.2	592.4	432.6	310.0
19. Netherlands	163.0	186.2	187.3	338.1	299.2
20. India	313.5	322.4	303.5	305.7	278.0
21. Mexico	267.4	186.0	214.0	268.7	255.0
22. Sweden	342.5	370.5	374.8	314.8	244.7
23. Yugoslavia	356.6	308.4	354.1	283.4	232.3
24. Poland (c)	428.5	434.4	347.0	313.7	225.4
25. Portugal	42.3	78.9	81.8	139.1	123.5
26. Denmark	102.5	84.0	90.6	131.1	118.7
27. Finland	120.9	114.1	152.4	195.1	108.0
28. Argentina	62.3	60.7	40.3	45.3	104.6
29. Czechoslovakia (c)	160.0	373.2	223.2	162.7	100.5
30. Bulgaria (c)	391.0	161.6	130.6	115.0	100.0
31. Hungary (c)	164.0	101.5	75.2	57.9	87.8
32. Australia (c)	177.3	75.6	76.4	90.4	82.0
33. South Africa	73.7	88.7	76.4	131.6	55.9
34. Hong Kong	70.4	23.6	20.5	32.3	12.2
35. East Germany (c)	308.5	443.6	475.0	600.0	(a)

Source: American Machinist, modified where possible with data from various national machine tool trade associations.

Note: Consumption = domestic production plus imports minus exports. "East Germany" included in "West Germany" beginning in 1991. a = included in "West Germany"; c = circa, rough estimate based on fragmentary data



(millions of U.S. dollars)

	1987	1988	1989	1990	1991(p)
1. Japan	\$6,382.6	\$8,668.9	\$10,058.8	\$10,946.1	\$11,632.3
2. West Germany	6,402.5	6,572.2	6,867.7	8,733.9	8,813.0
3. Italy	2,235.2	2,792.7	3,004.9	3,705.9	3,470.1
4. United States	2,612.1	2,795.2	3,453.4	3,382.1	3,265.9
5. Soviet Union (c)	3,976.3	4,263.1	5,000.0	4,000.0	2,500.0
6. Switzerland	1,652.4	1,865.0	1,769.7	2,311.5	2,027.2
7. China	632.5	750.6	1,151.9	1,173.9	1,445.8
8. United Kingdom	1,055.5	1,501.7	1,483.9	1,679.4	1,288.1
9. Taiwan	577.8	770.0	1,016.5	943.7	962.6
10. France	697.3	790.6	879.4	1,168.9	923.6
11. South Korea	530.9	632.4	744.2	785.1	798.4
12. Spain	575.0	702.2	806.7	1,015.4	750.6
13. Yugoslavia	515.0	550.0	630.0	630.0	375.0
14. Romania (c)	617.8	663.8	635.1	481.7	350.0
15. Brazil	523.0	536.0	461.0	301.0	350.0
16. Austria	153.5	174.5	303.5	368.8	345.0
17. Canada	244.1	344.4	361.2	363.3	300.9
18. Belgium	176.2	207.2	215.8	284.7	259.0
19. Sweden	223.0	243.7	236.6	255.7	231.4
20. India	190.8	200.0	210.6	237.3	202.7
21. Netherlands	45.4	66.6	78.4	140.4	180.8
22. Czechoslovakia (c)	405.0	450.0	260.0	191.9	141.8
23. Poland (c)	322.7	320.0	320.0	124.3	124.3
24. Bulgaria (c)	140.0	195.5	175.0	160.0	120.0
25. Singapore	35.5	41.8	53.0	104.6	113.0
26. Denmark	59.0	55.1	63.2	80.5	74.1
27. Hungary (c)	210.0	134.1	100.1	97.8	73.0
28. Finland	35.3	42.7	37.3	50.7	45.1
29. Argentina	39.9	48.6	41.6	44.8	32.6
30. Portugal	18.7	19.1	23.9	32.8	29.0
31. Hong Kong (c)	1.4	12.2	12.2	17.1	15.5
32. Mexico (c)	21.4	20.7	21.0	21.5	15.0
33. Australia (c)	45.0	12.2	12.3	15.6	14.0
34. South Africa	12.3	11.5	9.6	13.5	7.3
35. East Germany (c)	1,312.0	1,457.0	1,445.0	1,085.0	(a)
TOTAL	32,677.1	37,911.3	41,943.5	44,948.9	41,210.2

Source: American Machinist, modified where possible with data from various national machine tool trade associations.

Note: "East Germany" included in "West Germany" beginning in 1991. a = included in "West Germany"; c = circa, estimate based on fragmentary data

ARGENTINA

Industry Overview

(millions of U.S. dollars)

	Production	Imports	Exports	Consumption	% Import Penetration	Exports as % of Prod.
1980	\$58.6	\$82.2	\$28.0	\$112.8	72.9%	47.8%
1981	31.9	69.6	17.2	84.4	82.5	53.8
1982	18.6	39.2	9.0	48.8	80.3	48.4
1983	19.9	20.6	3.3	37.2	55.4	16.7
1984	19.2	22.6	3.0	38.8	58.2	15.7
1985	19.8	31.3	3.7	47.5	66.0	18.7
1986	33.1	16.4	4.7	44.8	36.7	14.3
1987	39.9	38.3	16.0	62.3	61.6	40.0
1988	48.6	44.6	32.6	60.7	73.6	67.0
1989	41.6	29.9	31.3	40.3	74.4	75.2
1990	44.8	32.1	31.7	45.3	71.0	70.7
1991p	32.6	86.2	14.2	104.6	82.4	43.6

Source: Argentine Association of Manufacturers of Machine Tools, Accessories, and Allied Industries (AAFMHA)

Note: (p) - preliminary, export and import figures for 1991 are the first 10 months annualized

ARGENTINA

Production

(millions of U.S. dollars)

	1987	1988	1989	1990	1991
MACHINE TOOL TOTAL	\$39.9	\$48.6	\$41.6	\$44.8	\$32.6
METAL CUTTING TOTAL	31.5	36.9	32.2	30.5	21.5
Non-NC lathes	7.7	11.3	6.4	5.3	2.7
NC lathes	10.1	11.5	10.9	9.8	6.3
Milling machines	2.7	3.0	3.1	4.8	1.6
Grinding machines	3.5	3.2	1.6	2.5	1.0
Drilling machines	2.1	1.8	1.5	1.8	1.1
Machining centers & transfer lines	1.4	2.0	3.5	5.7	3.9
Other metal cutting machines	4.1	4.0	5.2	0.6	4.9
METAL FORMING TOTAL	8.4	11.7	9.4	14.3	11.1
Presses	4.6	6.2	4.8	5.7	1.9
Guillotine shears	1.5	1.1	1.5	2.7	2.5
Other metal forming machines	2.3	4.4	3.1	5.9	6.7

Source: Argentine Association of Manufacturers of Machine Tools, Accessories, and Allied Industries (AAFMHA)

ARGENTINA

Exports by Type of Machine

(millions of U.S. dollars)

	1987	1988	1989	1990	1991(p)
MACHINE TOOL TOTAL	\$16.0	\$32.6	\$31.3	\$31.7	\$14.2
Lathes and machining centers	8.1	16.1	14.5	9.6	3.6
of which NC	4.0	9.8	9.7	6.9	1.6
Milling and boring machines	1.6	2.7	3.9	3.6	1.0
Drilling machines	0.6	0.8	0.7	0.9	0.4
Sawing and cutting-off machines	0.4	0.2	0.1	1.3	0.1
Threading machines	0.2	0.1	0.6	0.4	(a)
Grinding machines	0.9	2.0	1.0	1.9	0.7
Presses (excl. stamping & forging)	1.3	2.3	1.9	4.3	0.5
Bending, folding, and leveling	0.9	2.0	2.7	4.1	2.7
Punching or shearing machines	0.5	0.9	1.0	2.6	0.6
Other machine tools	1.4	5.5	5.1	3.0	4.6

Source: Argentine Association of Manufacturers of Machine Tools, Accessories, and Allied Industries (AAFMHA)

ARGENTINA

Exports by Destination

(millions of U.S. dollars)

	1987	1988	1989	1990	1991(p)
TOTAL EXPORTS	\$16.0	\$32.6	\$31.3	\$31.7	\$14.2
Bolivia	1.0	0.5	0.2	0.2	0.3
Brazil	11.2	22.2	23.5	24.0	8.2
Chile	0.5	3.8	2.2	2.6	2.1
Colombia	0.3	0.5	0.9	0.9	0.1
Mexico	0.1	0.3	0.5	0.7	0.6
Peru	1.7	1.5	1.1	0.5	0.6
United States	0.4	0.8	0.5	0.3	0.3
Uruguay	0.3	0.6	1.1	0.7	0.8
Venezuela	0.2	1.1	0.3	0.1	0.1
Other Countries	0.4	1.2	0.9	1.7	1.3

Source: Argentine Association of Manufacturers of Machine Tools, Accessories, and Allied Industries (AAFMHA)

Note: a = less than \$50,000; p = January-October only

ARGENTINA
Imports by Type of Machine

(millions of U.S. dollars)

	1987	1988	1989	1990	1991(p)
MACHINE TOOL TOTAL	\$38.3	\$44.6	\$29.9	\$32.1	\$86.2
of which NC	4.6	9.0	8.4	12.4	24.5
NC EDM	0.5	1.0	0.2	0.1	0.5
Machining centers	0.3	0.7	4.1	5.3	5.5
Lathes	4.0	8.0	6.8	7.6	18.2
of which NC	2.1	5.3	3.2	5.7	16.8
Milling and boring machines	3.4	4.5	3.4	3.1	3.0
of which NC milling	0.9	1.0	0.6	0.8	1.1
of which NC boring	—	—	—	0.4	0.1
Drilling machines	0.4	1.2	0.6	0.4	0.5
of which NC	0.3	0.6	0.4	0.1	0.3
Sawing and cutting-off	9.0	0.7	0.5	0.4	0.3
of which NC	—	0.2	—	—	—
Grinding machines	2.6	3.4	2.9	2.9	14.0
Presses	0.8	1.6	1.2	1.0	1.3
Bend, fold, level	3.9	4.0	1.7	2.4	1.0
Punching or shearing	2.1	1.9	1.8	0.5	1.2
Other machine tools	10.8	17.7	6.7	8.4	40.5
Industrial robots	0.5	—	(a)	—	0.2

Source: Argentine Association of Manufacturers of Machine Tools, Accessories, and Allied Industries (AAFMHA)

ARGENTINA
Imports by Country of Origin

(millions of U.S. dollars)

	1987	1988	1989	1990	1991(p)
TOTAL IMPORTS	\$38.3	\$44.6	\$29.9	\$32.1	\$86.2
Italy	14.2	14.9	11.0	9.1	9.8
Germany	8.9	15.2	7.8	11.9	42.0
Brazil	1.9	0.8	0.5	2.5	7.5
Spain	1.6	1.8	1.1	1.8	18.5
United States	2.5	5.3	2.8	2.4	4.3
Japan	1.3	2.6	2.4	1.3	0.9
Other European Community	2.6	0.3	2.4	0.9	1.7
Other Western Europe	3.7	1.2	0.3	0.5	(a)
Eastern Europe	0.4	1.0	1.3	1.1	(a)
Other Countries	1.2	1.5	0.5	0.7	1.5

Source: Argentine Association of Manufacturers of Machine Tools, Accessories, and Allied Industries (AAFMHA)

Note: a = less than \$50,000; p = January–October only

(millions of U.S. dollars)

	Production	Imports	Exports	Consumption	% Import Penetration	Exports as % of Prod.
1986	\$160.6	\$198.1	\$174.6	\$184.2	107.6%	108.7%
1987	153.5	249.0	191.2	211.3	117.8	124.6
1988	174.5	344.7	230.6	288.6	119.4	132.1
1989	294.0	313.1	266.4	340.7	91.9	90.6
1990	368.8	372.9	391.2	350.5	106.4	106.1
1991p	345.0	384.2	318.1	411.1	93.5	92.2

Source: Association of Austrian Machinery and Steel Construction Industries

AUSTRIA

Production

(millions of U.S. dollars)

	UNITS			VALUE		
	1988	1989	1990	1988	1989	1990
MACHINE TOOL TOTAL	na	10,254	4,484	\$174.5	\$294.0	\$368.8
METAL CUTTING TOTAL	na	9,819	3,832	150.1	241.4	289.4
Machining centers	na	na	na	(b)	47.6	68.1
Lathes	na	6,332	2,241	50.4	96.6	121.1
Drilling or boring	na	170	49	18.0	24.0	27.7
Milling machines	na	1,511	595	30.7	41.9	49.0
Grinding machines	na	1,083	121	17.7	19.3	12.1
Planing machines	na	9	13	(b)	0.2	0.5
Sawing or cutting-off	na	607	745	9.7	9.8	8.3
Other metal cutting	na	107	68	23.6	2.0	2.2
METAL FORMING TOTAL	na	435	652	24.4	52.6	79.4
Forging machines	na	10	13	(c)	23.5	42.0
Bending, forming, punching or shearing	na	64	77	5.0	13.1	20.2
Presses	na	309	477	5.7	11.6	10.9
Drawing machines	na	14	16	(c)	3.4	4.5
Other metal forming	na	38	69	13.7	1.0	1.8

Source: European Committee for Cooperation of the Machine Tool Industries (CECIMO)

Note: b = included in "other metal cutting"; c = included in "other metal forming"; p = preliminary; na = not available

AUSTRIA

Exports by Type of Machine

(millions of U.S. dollars)

	UNITS			VALUE		
	1988	1989	1990	1988	1989	1990
MACHINE TOOL TOTAL	na	20,230	17,958	\$230.6	\$266.4	\$391.2
METAL CUTTING TOTAL	na	13,709	13,187	183.7	205.8	267.5
Physico-chemical machines	na	102	133	na	13.4	19.0
Laser, photon beam	na	32	31	(b)	7.4	9.7
EDM	na	28	42	7.2	2.0	7.0
Other physico-chemical	na	42	60	(b)	4.1	2.4
Machining centers	na	33	850	na	4.5	12.4
Unit construction machines	na	8	24	na	0.4	2.4
Multi-station transfer	na	13	12	na	12.4	16.7
Lathes	na	8,137	6,245	78.2	85.3	114.1
NC horizontal	na	1,200	1,363	(d)	41.4	72.8
Other NC	na	80	104	(d)	12.1	17.9
Non-NC horizontal	na	6,626	4,362	na	29.4	16.9
Other non-NC	na	231	416	na	2.4	6.5
Way type unit heads	na	18	14	(b)	1.1	3.9
Drilling machines	na	332	1,031	2.5	4.5	4.3
of which NC	na	17	85	1.1	0.4	1.2
Boring-milling machines	na	68	78	1.6	2.3	1.5
of which NC	na	14	15	0.6	0.9	0.6
Boring machines	na	14	13	(a)	(a)	(a)
Milling machines	na	1,907	1,482	37.9	45.0	52.0
NC knee type	na	36	12	(e)	0.3	0.5
Other NC	na	546	578	(e)	38.1	43.3
Non-NC knee type	na	842	397	na	2.7	2.3
Other non-NC	na	483	495	na	3.9	5.9
Grinding machines	na	2,099	1,415	20.8	21.7	26.9
NC surface	na	2	25	na	0.3	0.6
Non-NC surface	na	387	214	na	0.8	1.1
Other NC grinding	na	67	62	na	13.3	14.8
Other non-NC grinding	na	839	611	na	3.7	4.9
Tool or cutter	na	234	189	na	0.3	0.9
Honing or lapping	na	24	11	na	0.3	0.2
Other	na	546	303	na	2.8	4.6
Threading or tapping	na	193	165	4.3	0.4	0.6
Planing machines	na	20	73	(b)	5.4	0.2
Shaping or slotting	na	25	6	(b)	0.1	0.1
Broaching machines	na	9	40	(b)	(a)	0.9
Gear cutting machines	na	21	9	0.2	(a)	0.3
Sawing or cutting-off	na	640	1,521	(b)	8.1	10.6
Other metal cutting	na	70	76	38.2	1.0	1.6
METAL FORMING TOTAL	na	6,521	4,771	46.9	60.6	105.6
Forging machines	na	21	70	12.6	10.2	43.8
Bending or forming	na	455	2,593	8.8	19.1	27.6
of which NC	na	36	64	1.6	9.0	8.7
Shearing machines	na	182	186	(c)	2.0	2.9
of which NC	na	3	6	na	0.3	0.4
Punching or notching	na	98	135	(c)	2.0	3.4
of which NC	na	5	9	na	0.5	1.4
Presses	na	901	1,144	8.0	10.0	27.9
of which hydraulic	na	375	458	na	6.1	18.1
Drawing machines	na	160	53	0.2	1.6	1.1
Wire working machines	na	151	146	10.0	14.1	13.7
Other metal forming	na	4,537	440	7.3	1.6	3.3

Source: European Committee for Cooperation of the Machine Tool Industries (CECIMO)

Note: a = less than \$50,000; b = included in "other metal cutting"; c = included in "other metal forming"; d = total exports of NC lathes in 1988 were \$57.5 million; e = total exports of NC milling machines in 1988 were \$32.1 million; na = not available

AUSTRIA

Imports by Type of Machine

(millions of U.S. dollars)

	UNITS			VALUE		
	1988	1989	1990	1988	1989	1990
MACHINE TOOL TOTAL	na	49,558	53,595	\$344.7	\$313.1	\$372.9
METAL CUTTING TOTAL	na	39,641	43,139	275.4	247.9	282.2
Physico-chemical	na	1,011	698	15.9	22.0	31.3
Laser, photon beam	na	45	80	na	3.9	6.9
Ultrasonic	na	58	199	na	1.8	0.3
EDM	na	141	189	na	13.4	20.9
Other	na	767	230	na	2.9	3.3
Machining centers	na	197	na	(b)	44.4	54.4
Unit construction	na	15	60	(b)	0.8	1.8
Multi-station transfer	na	123	23	(b)	43.6	4.0
Lathes	na	886	1,250	41.5	34.8	50.2
NC horizontal	na	116	178	na	14.4	26.5
Other NC	na	99	99	na	11.2	11.5
Non-NC horizontal	na	348	414	na	4.5	5.6
Other non-NC	na	323	559	na	4.8	6.6
Way type unit heads	na	36	96	na	2.7	3.7
Drilling machines	na	12,869	10,424	10.4	5.9	7.8
of which NC	na	50	43	na	1.0	2.4
Boring-milling	na	413	396	(c)	23.0	26.0
of which NC	na	105	121	na	17.4	17.4
Boring machines	na	33	8	(c)	(a)	0.2
Milling machines	na	1,264	1,731	30.1	19.4	31.9
NC knee type	na	7	7	na	0.6	1.2
Other NC	na	151	214	na	9.7	16.7
Non-NC knee type	na	137	225	na	2.2	2.9
Other non-NC	na	969	1,285	na	6.8	11.1
Grinding machines	na	17,717	22,497	38.2	35.0	50.6
NC surface	na	14	25	na	2.7	2.8
Non-NC surface	na	119	146	na	2.3	2.0
Other NC grinding	na	53	99	na	8.0	18.0
Other non-NC grinding	na	2,711	5,162	na	11.9	13.1
NC tool or cutter	na	21	54	na	0.6	1.5
Non-NC tool or cutter	na	6,369	7,864	na	2.2	3.4
Honing or lapping	na	82	931	na	0.8	2.3
Other	na	8,348	8,216	na	6.6	7.5
Threading or tapping	na	1,031	1,147	1.4	2.2	3.6
Planing machines	na	21	52	(d)	0.3	0.1
Shaping or slotting	na	8	15	(d)	(a)	0.7
Broaching machines	na	24	6	(d)	0.5	0.4
Gear cutting machines	na	13	168	0.5	0.3	0.3
Sawing or cutting-off	na	3,113	3,318	(d)	8.9	13.3
Other metal cutting	na	867	1,250	32.9	4.0	1.7
METAL FORMING TOTAL	na	9,899	10,456	69.4	65.2	90.7
Forging machines	na	146	52	4.2	1.2	1.6
Bending or forming	na	3,860	2,912	17.0	23.5	28.3
of which NC	na	177	177	5.1	7.8	8.2
Shearing machines	na	968	1,248	(e)	6.4	7.7
of which NC	na	40	36	(e)	1.5	2.1
Punching or notching	na	618	627	(e)	6.5	15.4
of which NC	na	22	68	(e)	3.2	10.0
Presses	na	2,249	2,251	17.7	15.0	23.8
of which hydraulic	na	749	1,019	na	7.2	11.2
Drawing machines	na	83	55	2.5	3.8	2.2
Thread rolling	na	5	29	0.2	0.2	0.4
Wire working machines	na	112	140	3.4	2.5	4.6
Other metal forming	na	1,858	3,142	6.7	6.2	6.8

Source: European Committee for Cooperation of the Machine Tool Industries (CECIMO)

Note: a = less than \$50,000; b = combined total is \$104.5 million; c = combined total is \$16.6 million; d = included in "other metal cutting"; e = combined punching, notching and shearing is \$17.7 million; na = not available

BELGIUM

Exports by Type of Machine

(millions of U.S. dollars)

	UNITS			VALUE		
	1988	1989	1990	1988	1989	1990
MACHINE TOOL TOTAL	45,838	39,355	34,181	\$299.6	\$397.1	\$543.7
METAL CUTTING TOTAL	28,517	21,185	18,402	163.5	231.6	327.6
Physico-chemical	1,308	972	1,985	8.6	8.6	19.2
Laser, photon beam	na	477	693	na	7.1	15.8
EDM	na	26	44	na	0.2	0.6
Other	na	469	1,248	na	1.4	2.9
Machining centers	(b)	45	62	(b)	0.7	2.3
Unit construction	(b)	164	656	(b)	0.1	0.5
Multi-station transfer	(b)	2,547	812	(b)	95.0	117.3
Lathes	1,795	2,200	1,287	58.8	94.4	137.8
NC horizontal	(d)	1,651	1,016	(d)	89.4	130.9
Other NC	(d)	82	16	(d)	0.4	0.6
Non-NC horizontal	na	439	253	na	3.4	3.0
Other non-NC	na	28	2	na	1.2	3.2
Way type unit heads	(b)	165	83	(b)	0.2	0.4
Drilling machines	1,811	1,091	2,581	2.0	1.8	3.1
of which NC	253	137	163	0.3	0.4	1.2
Boring-milling machines	(b)	173	110	(b)	4.5	4.8
of which NC	na	113	77	na	4.0	4.7
Boring machines	(b)	47	12	(b)	0.3	0.7
Milling machines	730	1,049	929	5.0	4.1	4.9
of which NC	80	203	52	2.2	2.0	1.1
Grinding machines	5,728	2,131	2,525	5.4	4.1	10.4
NC surface	na	22	10	na	0.3	0.2
Non-NC surface	na	46	50	na	0.4	0.1
Other NC grinding	na	20	21	na	0.1	0.3
Other non-NC grinding	na	337	671	na	1.2	1.9
NC tool or cutter	na	3	13	na	0.1	0.9
Non-NC tool or cutter	na	170	157	na	0.5	0.4
Honing or lapping	na	12	42	na	0.1	0.3
Other	na	1,521	1,561	na	1.5	6.3
Threading or tapping	2,095	2,392	1,289	4.4	4.4	2.3
Shape, slot, plane	(b)	650	1,142	(b)	0.4	0.1
Broaching machines	(b)	28	43	(b)	0.1	0.2
Gear cutting machines	124	159	109	5.7	9.6	19.8
Sawing or cutting-off	(b)	6,503	3,753	(b)	2.1	2.4
Other metal cutting	14,926	869	1,024	73.6	1.2	1.3
METAL FORMING TOTAL	16,722	18,170	15,779	123.5	165.5	216.2
Forging or die-stamping	603	455	323	6.7	1.7	1.3
Bending or forming	3,278	4,797	4,680	42.0	53.5	74.0
of which NC	780	772	1,232	20.0	23.5	35.1
Shearing machines	(e)	4,173	3,668	(e)	31.3	43.4
of which NC	(e)	134	99	(e)	4.0	7.9
Punching or notching	(e)	814	591	(e)	7.0	22.2
of which NC	(e)	119	330	(e)	5.6	11.2
Presses	4,709	2,832	2,570	28.9	41.4	49.8
of which hydraulic	na	344	717	na	6.9	6.4
Drawing machines	392	1,989	741	8.2	24.3	18.6
Thread rolling	223	463	393	0.4	0.7	0.7
Wire working machines	548	647	329	2.4	2.4	1.8
Other metal forming	4,032	2,000	2,484	3.7	3.1	4.4
Other machine tools	599	-	-	12.5	-	-

Source: European Committee for Cooperation of the Machine Tool Industries (CECIMO)

Note: a = less than \$50,000; b = included in "other metal cutting"; d = total exports of NC lathes in 1988 were 1,401 units at \$53.4 million; e = total exports of punching or shearing machines in 1988 were 2,937 units at \$31.2 million, of which 257 units and \$5.7 million were NC machines; na = not available

BELGIUM

Imports by Type of Machine

(millions of U.S. dollars)

	UNITS			VALUE		
	1988	1989	1990	1988	1989	1990
MACHINE TOOL TOTAL	206,630	191,687	116,120	\$369.0	\$453.0	\$601.1
METAL CUTTING TOTAL	75,457	73,092	63,987	256.2	350.0	470.0
Physico-chemical	1,896	3,596	1,703	18.3	18.1	33.5
Laser, photon beam	na	439	377	na	11.2	24.9
EDM	na	87	258	na	4.2	4.4
Other	na	3,070	1,068	na	2.7	4.1
Machining centers	(b)	1,098	379	(b)	38.3	30.6
Unit construction machines	(b)	282	746	(b)	0.3	2.0
Multi-station transfer	(b)	1,217	616	(b)	100.5	126.7
Lathes	3,325	3,070	3,387	73.1	114.8	169.8
NC horizontal	(d)	1,605	1,394	(d)	100.0	150.7
Other NC	(d)	70	71	(d)	4.8	6.4
Non-NC horizontal	na	842	837	na	6.6	7.7
Other non-NC	na	553	1,085	na	3.4	4.9
Way type unit heads	(b)	273	654	(b)	1.4	1.6
Drilling machines	10,358	11,676	8,115	10.5	7.2	9.3
of which NC	599	300	331	3.7	2.7	2.4
Boring-milling machines	(b)	645	373	(b)	5.0	7.0
of which NC	na	94	73	na	2.2	4.5
Boring machines	(b)	780	663	(b)	0.7	2.3
Milling machines	4,660	3,948	2,383	25.5	25.6	26.5
of which NC	467	443	353	17.8	17.4	17.0
Grinding machines	32,228	31,170	30,346	27.5	19.3	33.4
NC surface	na	46	31	na	2.6	3.2
Non-NC surface	na	203	819	na	2.0	3.5
Other NC grinding	na	89	93	na	4.2	10.4
Other non-NC grinding	na	895	1,264	na	2.9	4.9
NC tool or cutter	na	9	23	na	0.2	1.8
Non-NC tool or cutter	na	9,925	5,678	na	2.3	3.2
Honing or lapping	na	401	152	na	1.0	0.7
Other	na	19,602	22,286	na	4.2	5.6
Threading, for tapping	2,671	4,490	2,280	2.9	3.8	3.7
Shape, slot, plane	(b)	148	525	(b)	0.2	0.4
Broaching machines	(b)	37	6	(b)	0.7	0.4
Gear cutting machines	146	159	395	7.7	3.5	6.6
of which NC	37	15	14	3.3	0.9	3.4
Sawing or cutting-off	(b)	7,457	7,481	(b)	9.3	13.1
Other metal cutting	20,173	3,046	3,935	90.7	1.4	3.0
METAL FORMING TOTAL	76,437	118,595	52,133	97.3	103.0	131.1
Forging or die-stamping	383	1,625	441	2.8	2.2	2.6
Bending or forming	11,024	3,578	10,494	19.4	22.9	32.6
of which NC	189	268	474	5.9	8.9	13.8
Shearing machines	(c)	2,354	2,837	(c)	18.1	34.9
of which NC	na	74	163	na	2.5	5.8
Punching or notching	(c)	762	917	(c)	11.4	16.6
of which NC	na	329	361	na	7.2	9.8
Presses	3,591	7,528	6,446	19.8	18.1	18.3
of which hydraulic	na	4,322	1,518	na	4.9	5.1
Drawing machines	1,953	845	1,084	9.1	8.7	8.5
Thread rolling	69	14	18,208	0.2	0.1	0.2
Wire working machines	868	478	371	8.0	4.1	2.4
Other metal forming	58,549	101,411	11,335	38.0	17.4	14.9
Other machine tools	54,736	-	-	15.5	-	-

Source: European Committee for Cooperation of the Machine Tool Industries (CECIMO)

Note: a = less than \$50,000; b = included in "other metal cutting"; c = included in "other metal forming"; d = total imports of NC lathes in 1988 were 1,366 units at \$57.9 million

BRAZIL

Industry Overview

(millions of U.S. dollars)

	Production	Imports	Exports	Consumption	% Import Penetration	Exports as % of Prod.
1986	\$551.0	\$65.1	\$26.3	\$589.8	11.0%	4.8%
1987	523.0	113.7	24.5	612.2	18.6	4.7
1988	536.0	163.8	40.4	659.4	24.8	7.5
1989	461.0	166.9	30.6	597.3	27.9	6.6
1990	301.0	na	37.4	na	na	12.4

Sources: Brazilian Association of the Machine and Equipment Industry (ABIMAQ); National Syndicate of the Machine Industry (SINDIMAQ)

BRAZIL

Exports and Imports

(millions of U.S. dollars)

	EXPORTS			IMPORTS		
	Cutting	Forming	Total	Cutting	Forming	Total
1978	\$16.0	\$ 4.2	\$20.2	\$160.2	\$66.1	\$226.2
1979	31.5	7.7	39.2	107.9	37.4	145.3
1980	57.3	14.3	71.5	151.5	23.8	175.3
1981	53.0	20.9	73.9	95.8	27.9	123.6
1982	17.7	3.2	20.9	65.1	20.1	85.3
1983	21.8	2.4	24.2	37.6	6.6	44.2
1984	18.5	1.8	20.2	35.3	4.7	39.9
1985	5.5	22.5	28.1	26.6	13.8	40.4
1986	11.8	14.5	26.3	46.6	18.6	65.1
1987	10.9	13.6	24.5	84.0	29.7	113.7
1988	19.3	20.8	40.0	121.6	42.2	163.8
1989	23.6	7.0	30.6	129.1	37.8	166.9
1990	34.8	2.6	37.4	na	na	na

Sources: Brazilian Association of the Machine and Equipment Industry (ABIMAQ); National Syndicate of the Machine Industry (SINDIMAQ)

Note: na = not available

(thousands of U.S. dollars)

	UNITS			VALUE		
	1989	1990	1991	1989	1990	1991
MACHINE TOOL TOTAL	4,585	5,032	8,590	\$78,751	\$101,949	\$79,747
METAL CUTTING TOTAL	2,473	2,625	6,328	38,111	32,437	30,139
Physico-chemical machines	1,134	752	45	1,400	2,007	3,191
Machining centers	10	32	12	649	1,921	1,185
Single station transfer	1	5	1	13	346	429
Multi-station transfer	34	14	22	19,057	10,443	8,953
Lathes	147	402	381	2,421	2,706	1,244
of which NC	8	11	10	1,168	813	114
Way type unit heads	na	-	-	145	-	-
Drilling machines	368	165	83	4,029	1,609	1,978
of which NC	6	8	5	675	628	470
Boring-milling machines	22	18	14	521	1,204	326
Other boring machines	14	65	356	373	775	716
Milling machines	32	30	98	2,136	1,855	2,447
of which NC	3	6	10	1,583	1,574	2,149
Threading or tapping	16	42	5	311	131	193
Grinding machines	323	564	4,758	4,068	3,556	3,876
Surface	7	60	27	344	378	152
Other grinding	107	224	206	2,531	2,464	1,760
Tool or cutter	138	169	502	680	392	956
Honing or lapping	26	63	164	232	193	202
Other	45	48	3,859	281	129	806
Planing machines	-	-	1	-	-	6
Shaping or slotting	6	74	58	219	243	251
Broaching machines	-	11	13	-	9	29
Gear cutting machines	9	10	2	1,084	154	80
Sawing or cutting-off	146	427	422	1,334	5,035	4,791
Other metal cutting	227	56	57	662	575	444
METAL FORMING TOTAL	2,112	2,407	2,262	40,639	69,512	49,608
Forging or die-stamping	62	196	77	1,456	5,313	1,916
Bending or forming	1,057	869	889	14,090	24,192	17,986
of which NC	109	107	58	7,585	8,068	5,457
Shearing machines	30	139	78	765	3,005	1,868
of which NC	5	5	2	204	176	64
Punching or notching	37	168	343	1,415	2,711	2,011
of which NC	6	5	10	223	754	690
Presses	517	736	485	12,728	21,862	17,085
of which hydraulic	29	252	109	3,100	6,712	7,377
Draw benches	106	34	7	2,201	2,149	575
Thread rolling machines	25	9	4	106	69	21
Wire working machines	85	119	126	4,742	4,483	5,448
Other metal forming	193	137	253	3,136	5,729	2,697

Source: Statistics Canada

Note: na = not available

(millions of U.S. dollars)

	UNITS			VALUE		
	1989	1990	1991	1989	1990	1991
MACHINE TOOL TOTAL	125,494	99,658	86,457	\$449.7	\$437.6	\$349.1
METAL CUTTING TOTAL	117,965	93,347	82,270	321.3	290.7	231.6
Physico-chemical machines	581	684	527	22.4	23.1	16.2
Laser, light or photon	88	96	54	4.5	7.0	3.5
Ultrasonic processes	29	44	24	0.4	1.0	2.2
EDM	203	133	118	13.4	9.4	6.5
Other	261	411	331	4.1	5.7	4.0
Machining centers	473	337	255	65.5	51.8	36.5
Single station transfer	2	4	1	0.5	0.2	(a)
Multi-station transfer	11	11	19	1.2	6.7	8.2
Lathes	3,684	3,107	1,814	78.2	65.8	49.8
NC horizontal	471	341	256	53.7	46.0	37.8
Non-NC horizontal	2,323	2,121	1,270	17.5	14.5	8.1
Other NC	60	10	11	3.4	3.4	2.8
Other non-NC	830	635	277	3.7	2.0	1.1
Way type unit heads	296	155	114	0.2	0.2	0.1
Drilling machines	25,522	23,050	28,570	16.5	13.0	9.4
of which NC	31	20	8	3.5	4.0	1.8
Boring-milling machines	56	58	52	10.0	8.7	10.0
of which NC	25	24	35	8.3	7.0	8.3
Boring machines	268	171	118	12.9	11.3	6.8
Milling machines	1,827	994	678	26.7	20.1	24.5
NC knee-type	60	54	18	5.9	6.3	1.6
Non-NC knee type	1,565	799	485	11.6	7.3	2.6
Other NC	65	50	93	7.3	5.4	18.2
Other non-NC	137	91	82	1.8	1.0	2.1
Threading or tapping	874	860	847	2.8	2.9	2.8
Grinding machines	64,431	54,092	39,890	54.7	57.6	42.5
NC surface	12	15	6	2.0	2.8	0.1
Non-NC surface	699	437	328	6.8	5.0	4.1
Other NC grinding	50	84	38	14.4	25.8	16.3
Other non-NC grinding	14,213	6,030	14,465	12.4	7.3	7.2
NC tool or cutter	26	6	7	3.4	0.3	0.6
Non-NC tool or cutter	23,183	43,562	17,996	5.8	5.4	3.1
Honing or lapping	435	74	63	1.4	3.6	3.6
Other grind or polish	25,813	3,884	6,987	8.6	7.4	7.6
Planing machines	3	10	10	0.2	0.9	0.5
Shaping or slotting	23	47	20	0.8	0.8	0.3
Broaching machines	58	34	31	2.2	1.5	4.1
Gear cutting machines	70	51	38	5.7	6.6	4.3
Sawing or cutting-off	17,943	9,163	8,941	17.4	17.2	12.2
Other metal cutting	1,843	519	345	3.7	2.4	3.1
METAL FORMING TOTAL	7,529	6,311	4,187	128.4	146.9	117.5
Forging or die-stamping	221	199	131	12.6	14.0	54.9
Bending or forming	4,573	4,011	2,794	28.8	37.5	18.7
of which NC	246	261	164	13.6	23.5	8.8
Shearing machines	459	301	244	9.7	8.0	4.5
of which NC	86	54	43	4.3	4.1	2.1
Punching or notching	666	510	313	26.8	20.0	14.5
of which NC	132	118	71	18.5	14.7	11.7
Presses	541	533	226	28.3	50.4	11.4
of which hydraulic	296	179	53	17.9	10.3	9.2
Draw benches	46	47	28	2.6	4.9	1.8
Thread rolling machines	29	33	10	0.6	0.8	0.2
Wire working machines	410	294	188	11.5	6.7	6.3
Other metal forming	584	383	253	7.4	4.6	5.1

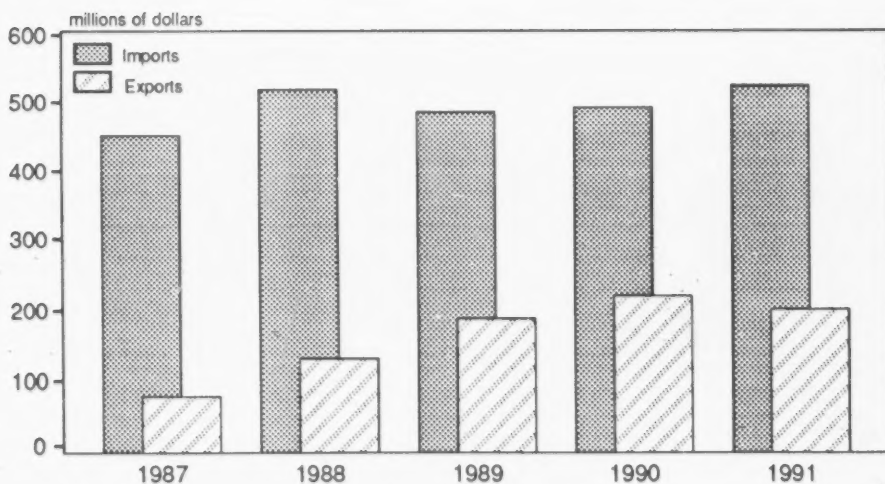
Source: Statistics Canada

Note: a = less than \$50,000

(units)

	1988	1989	1990	1991
MACHINE TOOL TOTAL	200,800	246,200	180,772	228,630
METAL CUTTING TOTAL	191,700	178,700	134,481	163,097
NC machine tools	2,681	2,742	2,634	4,051
Lathes	86,691	80,963	61,372	82,411
Drilling machines	23,429	20,984	16,948	20,115
Boring machines	4,962	5,445	4,823	4,455
Grinding machines	16,079	18,007	13,008	14,904
Milling machines	15,085	15,183	12,555	14,300
Planing machines	9,363	7,386	4,537	5,494
METAL FORMING TOTAL	9,100	67,500	46,291	65,533

Source: China Machine Tool & Tool Builders' Association (CMTBA)



Source: China Machine Tool & Tool Builders' Association (CMTBA)

BRAZIL

Production

(millions of U.S. dollars)

	UNITS					VALUE				
	1986	1987	1988	1989	1990	1986	1987	1988	1989	1990
MACHINE TOOL TOTAL	28,701	29,871	34,454	28,479	11,723	\$551	\$523	\$536	\$461	\$301
METAL CUTTING TOTAL	23,908	25,920	30,717	19,961	10,337	450	449	414	389	266
Lathes	8,537	8,314	6,529	7,076	5,998	164	197	182	161	130
Milling machines	1,730	1,969	1,216	4,722	409	4	48	47	43	27
Drilling machines	2,477	7,332	4,966	2,570	1,794	19	19	20	19	10
Boring & boring-milling machines	169	227	122	118	34	30	50	18	12	17
Planing machines	342	179	309	36	3	6	3	2	1	0
Sawing machines	5,022	3,568	9,107	4,190	945	7	7	6	16	6
Grinding machines	983	810	778	588	365	78	54	53	49	26
Sharpeners	249	159	300	385	312	6	4	10	23	5
Machining centers	191	120	70	87	36	42	39	37	61	24
Polish, rough grind, surface	3,700	2,702	6,038	149	4	24	20	5	(a)	(a)
Other metal cutting	404	355	191	40	447	3	8	34	4	21
METAL FORMING TOTAL	4,793	3,951	3,737	8,518	1,386	101	74	122	72	35
Sheet metal working	821	1,004	1,260	891	830	18	22	27	31	8
Presses	1,448	1,321	765	6,853	459	41	24	50	25	17
Other metal forming	2,524	1,626	1,712	774	97	42	28	45	16	26

Sources: Brazilian Association of the Machine and Equipment Industry (ABIMAQ); National Syndicate of the Machine Industry (SINDIMAQ)

Note: a = less than \$50,000

(millions of U.S. dollars)

	Production	Imports	Exports	Consumption	% Import Penetration	Exports as % of Prod.
1987	\$59.0	\$106.7	\$63.2	\$102.5	104.1%	107.1%
1988	55.1	108.9	80.0	84.0	129.6	145.2
1989	63.2	104.8	77.4	90.6	115.6	122.4
1990	80.5	146.0	95.4	131.1	111.4	118.5

Source: The Association of Danish Machine Tool Manufacturers

DENMARK

Production

(millions of U.S. dollars)

	UNITS		VALUE	
	1989	1990	1989	1990
MACHINE TOOL TOTAL	na	na	\$63.2	\$80.5
METAL CUTTING TOTAL	20,853	17,741	29.7	37.2
Physico-chemical machines	1	-	(a)	-
Machining centers	1	1	0.1	(a)
Lathes	292	545	0.3	0.7
Way type unit heads	105	184	2.6	5.9
Drilling machines	25	23	1.1	1.1
of which NC	22	20	1.1	1.1
Boring-milling machines	81	80	3.4	3.7
of which NC	22	9	1.9	1.0
Boring machines	127	61	1.7	1.7
Grinding & polishing	18,783	15,674	17.0	20.4
Sawing & cut-off machines	1,438	1,144	3.6	3.7
METAL FORMING TOTAL	na	na	33.5	43.3
Sheet metal working machines	208	3,312	16.6	25.5
Shearing machines	449	148	5.3	5.0
Punching or notching machines	na	na	4.9	4.4
Presses	15	na	6.7	8.5
Thread rolling machines	14	-	0.1	-

Source: The Association of Danish Machine Tool Manufacturers

Note: na = not available; a = less than \$50,000

DENMARK

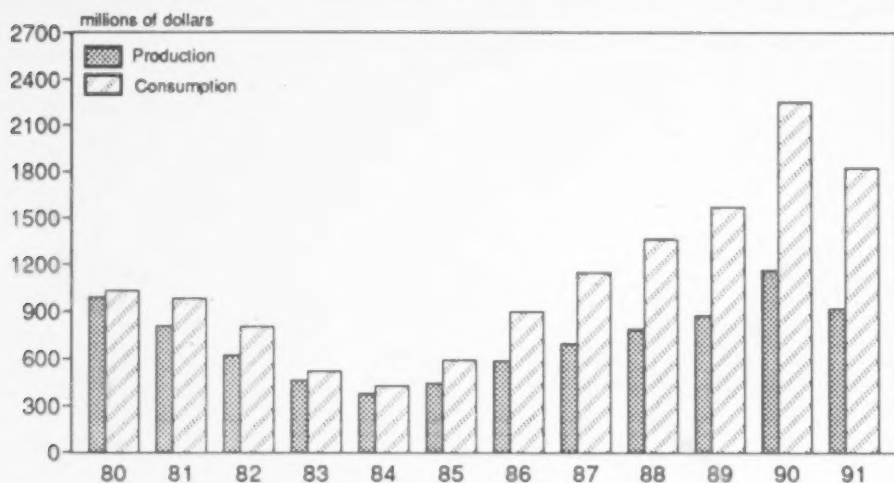
Exports and Imports by Type of Machine

(millions of U.S. dollars)

	EXPORTS				IMPORTS			
	1987	1988	1989	1990	1987	1988	1989	1990
MACHINE TOOL TOTAL	\$63.2	\$80.0	\$77.4	\$95.4	\$106.7	\$108.9	\$104.8	\$146.0
METAL CUTTING TOTAL	32.8	47.2	41.8	49.3	77.5	75.2	77.2	109.1
Physico-chemical	2.8	2.1	2.1	1.9	6.4	10.5	8.6	11.3
Machining centers	(b)	1.2	0.7	0.5	(b)	10.0	11.3	17.7
Transfer machines	(b)	(c)	0.5	0.5	(b)	(c)	0.5	1.0
Way type unit heads	(b)	(b)	0.6	0.3	(b)	(b)	0.3	4.2
Jig boring	0.4	(b)	(b)	(b)	9.1	(b)	(b)	(b)
of which NC	0.4	(b)	(b)	(b)	9.1	(b)	(b)	(b)
Thread or tap	0.4	0.9	0.3	0.4	2.3	1.7	1.2	1.1
Drilling machines	2.6	1.8	1.8	1.7	3.7	2.7	2.0	3.3
of which NC	0.3	0.8	1.2	0.8	0.9	1.5	0.5	1.2
Milling machines	2.3	4.1	1.0	3.1	10.5	5.9	5.7	4.9
of which NC	0.7	0.7	0.4	2.0	6.9	2.3	2.4	1.5
Planing machines	(a)	(b)	(a)	0.1	0.2	(b)	0.2	0.4
Shape, slot, cut-off	3.0	4.3	3.8	5.1	5.1	5.9	4.9	5.9
Lathes	1.7	2.4	3.5	2.2	20.2	18.3	21.8	33.4
of which NC	1.2	1.4	0.8	0.6	15.2	11.4	15.7	27.1
Boring, bore-mill	2.2	7.3	5.9	8.5	7.1	7.3	10.0	10.1
of which NC	0.4	2.1	1.8	1.1	6.4	4.4	6.7	8.4
Grinding machines	18.6	22.3	21.1	24.6	11.6	11.2	9.7	12.5
of which NC	2.0	2.3	1.9	2.5	5.1	2.9	3.4	5.4
Gear cutting	0.2	(a)	-	0.1	0.2	0.3	0.4	1.6
of which NC	-	-	-	-	0.1	(a)	(a)	1.3
Other metal cutting	(a)	0.8	0.5	0.3	0.9	1.4	0.5	1.8
METAL FORMING TOTAL	30.4	32.8	35.5	46.2	29.2	33.7	27.6	36.9
Forging or stamping	(a)	0.3	0.1	0.4	0.1	0.2	0.6	0.7
Presses	9.2	9.4	8.1	6.0	4.7	6.2	6.0	6.7
of which NC	3.2	1.9	na	1.1	2.5	0.7	na	3.9
Bending or forming	11.4	13.8	16.8	24.7	7.1	8.6	6.2	10.0
of which NC	6.1	8.6	11.5	18.6	3.8	3.2	2.0	4.2
Shearing machines	7.7	8.5	6.7	9.9	11.0	14.1	6.1	6.0
of which NC	2.7	3.0	2.9	1.4	6.1	7.2	2.3	1.4
Punching or notching	(d)	(d)	3.3	3.4	(d)	(d)	4.5	9.3
of which NC	(d)	(d)	0.5	0.6	(d)	(d)	3.1	5.8
Drawing machines	0.2	(a)	0.1	0.2	0.1	0.3	0.2	0.4
Thread rolling	(a)	(a)	0.1	0.1	0.1	0.2	0.1	(a)
Wire working machines	0.2	0.1	0.1	0.1	1.6	1.0	1.2	1.3
Other metal forming	1.7	0.7	0.3	1.5	4.6	3.0	2.6	2.6

Source: The Association of Danish Machine Tool Manufacturers

Note: a = less than \$50,000; b = included in "other metal cutting"; d = included in "other metal forming"



(millions of U.S. dollars)

	Production	Imports	Exports	Consumption	% Import Penetration	Exports as % of Prod.	Employment
1980	\$995.3	\$554.1	\$515.9	\$1,033.5	53.6%	51.8%	19,650
1981	809.4	566.6	390.5	985.5	57.5	48.2	19,000
1982	622.2	479.3	195.0	806.5	59.4	47.4	17,660
1983	464.5	351.1	295.2	520.4	67.5	63.6	15,500
1984	376.7	301.2	250.1	427.8	70.4	66.4	13,400
1985	444.7	357.5	208.6	593.6	60.2	46.9	12,050
1986	588.1	618.0	308.1	898.0	68.8	52.4	11,450
1987	697.3	738.1	284.3	1,151.1	64.1	40.8	10,025
1988	790.6	971.1	306.1	1,365.6	71.1	50.1	9,190
1989	879.4	1,110.5	415.9	1,574.0	70.6	47.3	9,475
1990	1,168.9	1,627.8	538.6	2,258.1	72.1	46.1	9,810
1991p	923.6	1,345.5	442.4	1,826.7	73.7	47.9	9,430

Source: French Association For Machine Tool Assembly and Related Advanced Manufacturing Technology (SYMAP)

Note: p = preliminary

FRANCE

Production

(millions of U.S. dollars)

	UNITS			VALUE		
	1988	1989	1990	1988	1989	1990
MACHINE TOOL TOTAL	34,187	na	42,430	\$790.6	\$879.4	\$1,168.9
of which NC	3,657	na	5,393	532.3	583.7	750.6
METAL CUTTING TOTAL	27,821	na	35,480	602.7	662.8	885.6
of which NC	2,641	na	3,550	468.9	490.6	611.0
Physico-chemical	125	(b)	(b)	5.7	(b)	(b)
of which NC	7	(b)	(b)	1.6	(b)	(b)
Machining centers	256	291	337	52.4	72.7	84.5
Horizontal	112	166	na	31.7	51.7	na
Vertical	144	125	na	20.7	21.0	na
Transfer machines	475	544	265	134.9	142.6	212.1
of which NC	60	115	na	118.9	125.5	na
Lathes	832	1,226	1,414	102.8	134.7	194.3
NC horizontal	na	886	624	na	100.1	79.6
Other NC lathes	na	43	482	na	20.9	97.9
Non-NC horizontal	na	253	293	na	10.8	15.1
Other non-NC lathes	na	44	15	na	2.8	1.7
Way type unit heads	(b)	(b)	585	(b)	(b)	5.9
Boring or drilling	2,318	2,757	2,613	5.1	7.9	10.7
Milling machines	566	680	687	82.7	113.3	133.8
NC knee type	na	na	180	na	na	17.9
Other NC	na	na	296	na	na	103.6
Non-NC knee type	na	na	175	na	na	8.5
Other non-NC	na	na	36	na	na	3.8
Grinding machines	10,061	3,680	8,545	15.4	23.7	45.6
of which NC	7	na	34	1.1	na	12.0
Sawing or cutting-off	1,852	2,427	3,588	10.7	14.0	21.3
Other metal cutting	11,646	na	17,446	195.2	154.0	177.4
METAL FORMING TOTAL	6,366	na	6,950	187.9	216.5	283.4
of which NC	1,016	na	1,843	63.4	93.2	139.6
Presses	989	1,926	2,050	23.1	64.7	96.5
of which hydraulic	na	347	1,198	na	21.5	69.7
Bending or forming	958	443	426	41.6	6.6	5.0
of which NC	495	na	na	27.3	na	na
Punching or shearing	2,268	2,500	2,635	32.8	56.3	56.7
of which NC	242	247	688	3.0	7.5	26.2
Wire working machines	138	74	91	8.7	8.8	13.3
Other metal forming	2,013	na	1,748	81.7	80.0	111.9

Source: French Association For Machine Tool Assembly and Related Advanced Manufacturing Technology (SYMAP)

Note: b = included in "other metal cutting"; na = not available

Some confidential data withheld from individual product categories have been included in the "other metal cutting" and "metal forming" categories. NC portion of "METAL CUTTING TOTAL" and "METAL FORMING TOTAL" includes all NC machines, including withheld data.

FRANCE

Imports and Exports by Type of Machine

(millions of U.S. dollars)

	IMPORTS				EXPORTS			
	1988	1989	1990	1991	1988	1989	1990	1991
MACHINE TOOL TOTAL	\$971.1	\$1,110.5	\$1,627.8	\$1,345.5	\$396.1	\$415.9	\$538.6	\$442.4
METAL CUTTING TOTAL	758.9	850.1	1,187.1	965.8	254.1	258.2	312.6	278.5
Physico-chemical	75.9	86.3	119.2	89.3	31.9	25.6	28.1	23.6
Laser or photon	10.9	18.5	29.6	28.8	10.0	5.1	7.0	3.0
of which NC	5.8	12.4	21.3	19.3	2.3	0.5	2.4	0.7
Ultrasonic	3.0	3.8	2.1	1.8	1.1	3.0	1.6	0.7
of which NC	0.7	-	0.4	0.5	0.1	0.3	0.3	(a)
EDM	51.4	54.6	72.3	46.1	4.2	2.3	2.1	4.3
of which NC	40.8	46.3	62.7	39.2	1.4	1.8	1.7	3.6
Other	10.6	9.4	15.2	12.6	16.6	15.1	17.4	15.6
of which NC	2.1	2.0	3.7	3.5	4.2	2.7	3.4	1.1
Machining centers	114.0	145.6	213.3	161.2	37.6	44.1	40.4	37.0
Transfer machines	62.0	49.1	63.5	85.8	9.7	6.3	19.0	19.8
Unit construction	14.1	12.9	19.0	18.1	3.5	3.3	3.4	4.1
of which NC	8.8	8.6	13.1	12.8	2.7	1.8	1.9	3.5
Multi-station transfer	47.8	36.3	44.5	67.7	6.2	3.0	15.6	15.7
of which NC	35.6	22.6	28.2	36.4	1.8	1.3	1.8	6.6
Lathes	161.2	201.9	294.9	199.0	59.9	56.4	74.9	63.8
NC horizontal	112.6	143.5	180.6	121.1	36.4	38.4	44.0	33.5
Parallel	34.1	41.7	57.2	41.4	3.6	5.4	10.6	3.5
Multiple spindle	31.9	43.3	51.3	31.3	4.2	4.9	2.1	8.8
Copying	2.0	6.0	6.9	2.2	0.6	0.9	1.0	-
Automatic or turret	40.1	47.6	59.0	40.3	25.4	25.2	29.6	19.5
Other	4.5	4.8	6.2	5.9	2.6	1.9	0.8	1.7
Non-NC horizontal	31.9	39.1	59.4	36.4	8.7	8.6	14.0	12.4
Parallel	7.3	8.8	15.4	11.8	3.6	2.2	4.5	3.0
Multiple spindle	6.0	4.2	8.9	4.1	0.5	0.4	1.3	1.1
Copying	0.8	1.3	1.1	1.1	0.4	0.1	0.2	(a)
Automatic or turret	15.2	18.9	25.0	11.5	1.8	2.3	3.1	5.1
Other	2.6	6.0	9.0	7.9	2.3	3.6	5.0	3.2
Vertical lathes	8.9	10.3	36.2	28.6	9.6	4.1	8.2	10.3
of which NC	6.9	8.2	33.0	22.0	8.5	2.2	7.4	9.1
Other lathes	7.8	9.0	18.7	12.9	5.2	5.3	8.7	7.6
of which NC	4.0	3.6	9.3	7.5	0.8	1.9	4.6	3.0
Way type unit heads	11.3	10.3	21.5	15.5	5.8	4.1	1.9	6.2
Drilling machines	24.6	26.6	34.5	33.4	6.1	7.8	9.4	7.3
NC radial	3.5	3.8	1.9	1.2	0.6	1.2	1.3	0.4
NC multiple-spindle	3.1	1.7	6.7	8.2	(a)	0.5	0.4	0.1
Other NC drilling	4.2	3.9	6.6	5.9	0.9	1.2	2.2	1.7
Non-NC radial	1.5	2.4	4.1	4.2	0.1	0.3	0.3	0.5
Non-NC multi-spindle	2.0	3.5	3.3	1.7	0.1	0.1	0.2	1.0
Other non-NC drilling	10.3	11.3	11.9	12.1	4.4	4.5	5.0	3.6
Boring-milling machines	34.4	31.0	42.6	37.5	3.4	3.0	1.2	4.7
of which NC	30.0	23.8	32.9	30.2	1.1	2.3	0.5	3.4
Boring machines	3.4	3.6	3.5	5.0	3.1	1.8	1.3	1.5
of which NC	0.6	1.8	(a)	1.2	0.2	0.1	0.1	1.1
Milling machines	66.3	68.5	97.6	83.8	44.8	52.2	56.1	46.9
NC knee type	8.5	7.1	9.7	9.8	1.5	0.6	1.2	1.6
Non-NC knee type	5.7	5.6	14.1	8.1	4.3	-5.8	4.7	4.8
NC tool milling	9.9	14.5	19.2	16.4	11.6	16.4	26.9	16.1
NC plano-milling	2.3	0.2	0.6	0.2	0.2	0.7	0.1	2.7
Other NC milling	24.2	27.6	33.0	27.5	22.1	24.4	17.9	12.2
Non-NC tool milling	2.2	2.0	3.1	3.4	0.6	0.6	0.5	1.0
Non-NC plano-milling	2.1	0.7	0.5	0.7	0.3	0.4	0.3	0.1
Other non-NC milling	11.3	10.7	17.4	17.7	4.1	3.5	4.6	8.4
Threading or tapping	5.7	9.7	10.9	5.0	2.1	2.3	2.0	3.3
Grinding machines	131.6	139.9	180.2	170.8	31.7	32.7	44.2	33.9
NC surface	12.9	12.7	14.8	23.7	0.5	1.0	2.2	1.0
Non-NC surface	10.2	17.4	20.4	12.8	3.0	1.9	2.2	4.0
NC cylindrical	21.3	24.3	40.4	44.0	1.2	1.3	3.3	3.4
Non-NC cylindrical	15.9	18.4	19.1	18.2	2.7	0.9	3.4	0.9

(continued)

FRANCE

Imports and Exports by Type of Machine
(continued)

(millions of U.S. dollars)

	IMPORTS				EXPORTS			
	1988	1989	1990	1991	1988	1989	1990	1991
Other NC grinding	21.6	17.5	27.1	15.3	1.7	2.3	2.6	2.7
Other non-NC grinding	15.5	16.7	17.8	13.7	5.9	8.6	11.6	8.9
NC tool or cutter	3.6	2.9	6.6	8.6	1.5	1.9	2.4	1.1
Non-NC tool or cutter	10.1	10.4	10.6	9.1	4.2	3.8	3.6	2.3
Honing or lapping	3.9	5.3	5.2	7.5	1.8	1.3	1.1	0.4
Other grind or polish	16.6	14.2	18.2	17.9	9.1	9.6	11.8	9.2
Planing machines	0.3	0.1	0.8	0.3	1.6	0.6	0.6	0.9
Shaping or slotting	0.7	0.7	1.2	0.6	0.9	0.5	0.5	0.5
Broaching machines	8.4	7.0	15.3	7.2	1.8	0.5	1.1	0.6
Gear cutting machines	23.7	29.0	34.0	20.5	1.4	2.0	2.5	3.6
NC gear hobbing	10.8	10.4	16.7	7.1	(a)	(a)	0.1	(a)
Non-NC gear hobbing	4.3	3.1	5.4	4.4	0.2	0.3	0.6	0.6
Other NC gear cut	1.0	3.9	2.7	6.0	(a)	0.3	0.2	1.1
Other non-NC gear cut	2.5	5.8	5.7	1.7	1.2	1.1	1.0	1.6
Gear finishing	5.1	5.8	3.5	1.3	0.1	0.2	0.6	0.3
Sawing or cutting-off	29.7	33.0	47.1	43.8	9.3	14.6	19.7	18.0
Circular sawing	10.9	10.6	16.5	15.3	3.0	6.3	7.1	8.5
Non-circular sawing	10.1	13.6	19.5	16.3	4.0	4.4	8.3	5.5
Cutting-off machines	8.7	8.8	11.1	12.2	2.3	3.9	4.3	4.0
Other metal cutting	5.9	7.7	6.8	7.4	3.1	4.0	9.5	6.6
METAL FORMING TOTAL	212.2	260.4	440.7	379.7	142.1	157.7	226.0	164.0
Forging or die-stamping	16.6	12.7	42.6	47.1	24.7	12.2	7.2	7.1
of which NC	5.6	3.0	7.1	5.0	0.9	1.1	0.3	2.4
Bending or forming	45.2	54.9	76.4	88.8	23.9	37.3	75.2	56.9
NC for flat products	7.4	13.8	14.5	18.2	2.2	13.3	28.0	22.6
Other NC	6.5	7.3	11.2	14.1	2.9	4.6	8.3	5.0
Non-NC, flat products	15.1	14.1	24.2	23.6	5.9	6.9	13.6	12.0
Other non-NC hydraulic	5.8	7.4	8.2	13.5	9.4	6.8	10.5	4.5
Other non-NC	10.4	12.3	18.3	19.4	3.6	5.7	14.8	12.8
Punching or shearing	75.9	89.0	132.4	98.3	36.4	54.1	84.3	54.1
NC shear for flat prod.	3.2	6.1	12.1	8.7	2.7	5.2	16.1	9.3
Other NC shearing	2.4	2.6	5.3	5.5	1.1	1.6	2.2	2.1
NC punch or notch*								
for flat products	32.2	39.1	48.2	29.6	8.8	18.8	32.2	15.6
Other NC punch/notch*	10.0	5.5	7.2	6.2	3.7	1.4	3.7	2.9
Non-NC shearing for flat products	5.5	7.8	12.3	5.9	8.2	9.0	8.9	9.7
Other non-NC hyd. shear	3.1	7.5	13.4	7.7	4.6	6.3	9.4	7.4
Other non-NC shearing	5.1	3.5	8.6	9.6	2.4	3.5	5.2	3.8
Non-NC punch or notch*								
for flat products	7.4	7.0	12.6	14.5	2.3	5.2	3.2	1.5
Other non-NC punching or notching*	7.0	9.9	12.7	10.5	2.6	3.1	3.4	1.9
Presses	40.1	50.4	97.8	79.0	34.9	28.1	31.8	19.7
Hydraulic	19.7	21.8	28.6	29.4	20.6	16.5	13.8	7.1
Metal, powder, scrap	2.3	2.6	5.4	4.6	1.5	0.6	1.3	1.4
Other NC	8.3	7.2	9.6	12.7	16.1	10.5	7.7	0.9
Non-NC bolts, rivets	0.7	0.8	1.6	0.3	(a)	(a)	(a)	0.1
Other non-NC	8.4	11.2	12.0	11.8	3.1	5.4	4.8	4.7
Non-hydraulic	20.5	28.7	69.3	49.6	14.4	11.5	17.9	12.5
Metal, powder, scrap	0.3	2.9	3.4	1.2	0.4	1.2	2.8	0.2
Other NC	0.8	0.6	3.4	3.9	0.5	1.5	0.4	0.5
Non-NC bolts, rivets	4.5	4.0	9.8	7.9	0.2	(a)	0.9	0.2
Other non-NC	14.9	21.2	52.7	36.6	13.3	8.8	13.8	11.6
Draw benches	5.7	7.9	10.7	5.3	3.0	7.6	6.8	5.4
Thread rolling machines	2.9	2.0	3.5	2.6	0.8	0.6	1.1	0.3
Wire working machines	9.4	12.3	13.9	11.3	7.8	5.3	7.8	4.0
Other metal forming	16.5	31.2	63.1	40.6	10.7	12.6	11.9	14.6

Source: French Association For Machine Tool Assembly and Related Advanced Manufacturing Technology (SYMAP)

Note: * = includes combined punching and shearing machines; a = less than \$50,000

FRANCE

Exports by Destination

(millions of U.S. dollars)

	1987	1988	1989	1990	1991
TOTAL EXPORTS	\$284.3	\$396.1	\$415.9	\$538.6	\$442.4
Germany	50.7	43.9	71.3	118.0	101.4
Italy	21.2	34.3	39.4	57.7	44.8
United States	15.0	20.9	37.0	38.7	25.3
United Kingdom	17.4	38.6	31.4	38.0	27.5
Belgium-Luxembourg	12.3	18.3	20.9	35.1	36.3
Switzerland	18.8	26.5	23.4	33.0	32.9
Spain	12.4	14.1	20.6	28.0	25.6
China	4.5	3.6	7.8	8.3	13.9
Portugal	3.1	2.6	7.2	6.3	13.1
Netherlands	5.4	8.1	5.1	10.5	9.4
Algeria	13.6	12.2	11.2	20.4	8.4
Austria	2.3	3.4	(b)	5.8	7.7
USSR	24.0	20.6	6.8	17.5	(b)
Sweden	4.8	6.0	5.2	10.3	(b)
Morocco	2.7	5.1	5.1	9.1	(b)
Yugoslavia	0.7	3.5	(b)	9.0	(b)
East Germany	5.8	39.1	39.1	(c)	(c)
Other Countries	69.6	95.3	84.4	92.9	96.2

Source: French Association For Machine Tool Assembly and Related Advanced Manufacturing Technology (SYMAP)

FRANCE

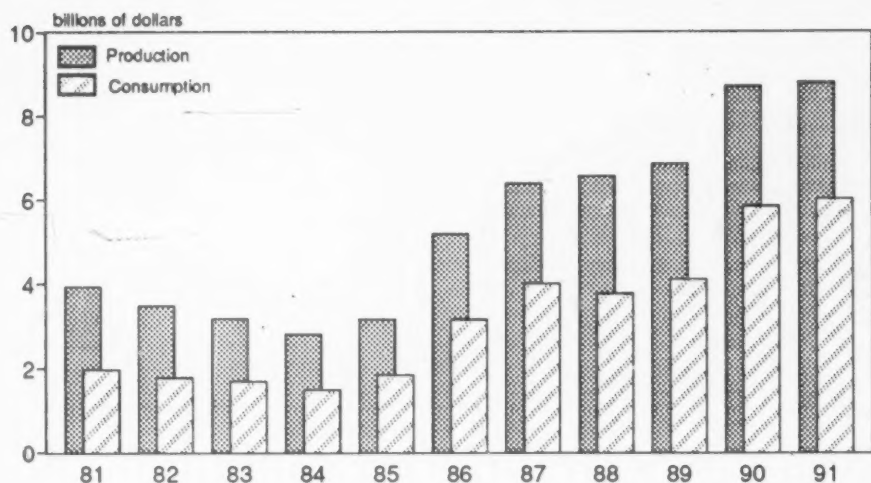
Imports by Country of Origin

(millions of U.S. dollars)

	1987	1988	1989	1990	1991
TOTAL IMPORTS	\$738.1	\$971.1	\$1,110.5	\$1,627.8	\$1,345.5
Germany	225.6	295.3	336.9	530.2	381.3
Italy	152.8	166.7	192.2	286.8	284.1
Switzerland	108.2	125.4	141.4	198.7	149.6
Japan	84.6	127.2	143.9	179.9	137.7
United States	24.8	30.9	40.4	83.2	89.2
United Kingdom	35.3	62.2	64.6	88.0	71.0
Spain	22.4	33.1	46.9	74.8	67.3
Belgium-Luxembourg	17.5	28.8	26.9	35.5	39.9
Taiwan	14.1	21.0	26.4	37.6	28.6
Austria	8.9	11.7	15.1	22.1	19.7
Sweden	5.3	6.1	13.5	15.1	10.3
Netherlands	3.8	7.2	8.4	11.5	10.1
Czechoslovakia	2.5	3.6	6.2	9.7	9.7
USSR	2.9	3.4	4.1	5.5	(b)
East Germany	6.6	6.7	10.3	(c)	(c)
Other Countries	22.8	41.8	33.3	49.4	47.0

Source: French Association For Machine Tool Assembly and Related Advanced Manufacturing Technology (SYMAP)

Note: b = included in "Other Countries"; c = included in "Germany"



(millions of U.S. dollars)

	Production	Exports	Imports	Consumption	% Import Penetration	Exports as % of Prod.	Employment
1977	\$2,635.1	\$320.3	\$1,823.2	\$1,132.2	28.3%	69.2%	95,900
1978	3,279.6	461.6	2,122.6	1,618.6	28.5	64.7	94,800
1979	4,008.3	621.4	2,509.2	2,120.5	29.3	62.6	95,000
1980	4,707.8	802.2	2,964.7	2,545.3	31.5	63.0	98,000
1981	3,953.4	616.4	2,584.9	1,984.9	31.1	65.4	97,000
1982	3,504.9	488.6	2,206.4	1,787.1	27.3	63.0	93,000
1983	3,193.5	452.7	1,950.4	1,695.8	26.7	61.1	83,700
1984	2,812.7	467.0	1,781.9	1,497.8	31.2	63.4	83,000
1985	3,168.4	612.8	1,930.4	1,850.8	33.1	60.9	88,000
1986	5,185.4	1,050.6	3,079.7	3,156.3	33.3	59.4	93,000
1987	6,402.5	1,204.3	3,593.0	4,013.8	30.0	56.1	93,500
1988	6,572.2	1,266.9	4,070.0	3,769.1	33.6	61.9	94,000
1989	6,867.7	1,479.2	4,236.8	4,110.1	36.0	61.7	97,500
1990	8,733.9	2,131.8	5,016.4	5,849.3	36.4	57.4	102,000
1991*	8,813.0	2,308.2	5,103.8	6,017.4	38.4	57.9	98,000

Source: German Machine Tool Manufacturers' Association (VDW)

Note: Figures do not include parts and accessories; *Beginning in 1991, East Germany is included in all figures except employment. "West German" production in 1991 was \$8,122.5 million; "East German" production was \$690.5 million.

CHINA

Exports by Type of Machine

(thousands of U.S. dollars)

	UNITS					VALUE				
	1987	1988	1989	1990	1991	1987	1988	1989	1990	1991
MACHINE TOOL TOTAL	183,868	433,218	602,975	611,897	926,554	\$79,109	\$131,847	\$188,308	\$221,711	\$201,823
METAL CUTTING TOTAL	172,594	411,595	585,357	599,951	901,967	66,756	112,697	160,334	180,043	165,118
Physico-chemical	31	93	90	151	167	1,007	2,023	1,711	2,205	1,109
CNC gear cutting	46	25	12	na	30	326	249	273	na	2,211
Gear cutting	110	133	437	719	797	1,131	1,818	2,467	5,301	8,645
CNC lathes	948	486	294	na	262	4,085	4,027	4,975	na	2,944
Lathes	4,454	6,841	11,705	19,629	19,434	22,924	32,350	59,545	84,634	63,976
CNC milling	55	100	196	na	44	346	849	1,333	na	494
Milling machines	1,564	3,165	5,129	6,742	5,016	10,434	18,911	26,417	34,617	24,151
Bench drills	14,549	77,983	129,021	142,591	218,249	1,238	4,379	6,977	7,929	11,066
CNC drilling machines	173	46	48	na	18	185	62	221	na	79
Drilling machines	1,042	3,128	3,653	5,339	4,938	4,354	9,053	11,962	15,489	11,343
CNC boring machines	3	14	10	na	55	288	745	161	na	2,770
Boring machines	272	801	1,196	na	858	1,274	7,805	8,280	na	3,739
Circular sawing	424	303	591	na	7	48	47	77	na	13
Band or hack sawing	223	503	1,136	na	922	175	301	479	na	572
Sawing machines	132	290	587	4,440	566	34	209	275	1,201	392
CNC planing machines	11	1	81	na	2	73	34	261	na	5
Planing machines	688	1,522	1,307	1,781	1,588	2,043	4,694	4,168	4,596	5,449
Threading or tapping	408	604	615	716	912	123	196	350	650	340
CNC grinding machines	2	2	11	na	4	12	10	2,293	na	247
Grinding machines	942	1,111	1,357	1,566	1,343	13,346	18,604	19,378	15,251	10,540
Grinding wheel mach.	140,791	290,203	403,434	414,153	645,102	2,604	5,145	7,629	8,402	14,409
Polishers	5,728	24,241	23,847	na	1,653	735	1,186	1,103	na	522
METAL FORMING TOTAL	7,473	15,901	12,042	14,070	12,199	8,715	11,769	20,907	20,817	24,839
CNC presses	60	1	109	na	144	125	6	97	na	163
Presses	1,110	393	861	706	660	1,073	928	1,633	1,735	1,764
Bend or straighten	197	343	334	405	647	271	314	1,111	2,386	3,944
Shearing machines	288	569	1,089	3,382	1,522	1,558	1,097	3,147	6,119	5,778
Punching machines	1,251	6,731	2,709	na	2,114	841	2,445	2,548	na	2,490
Other metal forming	4,567	7,864	6,940	9,577	7,146	4,847	6,979	12,372	10,077	10,699
Slot,broach,thread roll	3,799	5,722	6,176	na	12,388	3,613	7,381	7,067	na	11,866

Source: China Machine Tool and Tool Builders' Association (CMTBA)

Note: na = not available; Individual items may not add up to totals due to rounding

CHINA

Imports by Type of Machine

(thousands of U.S. dollars)

	UNITS					VALUE				
	1987	1988	1989	1990	1991	1987	1988	1989	1990	1991
MACHINE TOOL TOTAL	25,817	44,489	41,730	30,368	58,764	\$453,579	\$519,010	\$486,270	\$492,828	\$523,973
METAL CUTTING TOTAL	12,870	22,107	20,102	22,640	41,421	244,546	227,429	243,050	261,688	266,397
Physico-chemical	134	190	173	316	689	26,068	28,097	12,009	12,720	18,611
CNC gear cutting	33	13	120	na	28	6,204	7,598	4,907	na	10,160
Gear cutting	115	72	182	93	180	11,105	5,470	7,189	10,756	10,350
CNC lathes	155	148	125	na	143	28,856	19,803	20,993	na	20,681
Lathes	2,140	3,607	3,785	5,919	6,189	15,716	18,512	24,641	47,772	30,934
CNC milling	74	66	100	na	143	23,140	16,524	22,181	na	26,903
Milling machines	764	1,094	1,511	1,605	2,004	15,808	15,884	23,973	47,274	20,223
Bench drills	67	118	129	442	229	19	85	55	77	54
CNC drilling machines	31	23	18	na	54	4,839	2,749	4,601	na	8,190
Drilling machines	3,758	4,208	3,937	4,632	5,624	4,013	5,200	5,329	30,035	6,220
CNC boring machines	20	9	19	na	22	5,790	6,880	10,564	na	8,778
Boring machines	78	59	83	na	60	16,196	11,871	12,118	na	8,391
Circular sawing	15	42	18	na	169	88	34	162	na	2,548
Band or hack sawing	48	27	66	na	37	764	291	921	na	320
Sawing machines	339	1,541	605	671	751	2,170	2,655	3,120	3,346	1,508
CNC planing machines	na	3	4	na	-	na	1,199	451	na	-
Planing machines	251	461	459	502	632	673	1,237	1,382	1,639	2,014
Threading or tapping	314	247	391	360	416	2,397	2,307	2,965	2,195	1,772
CNC grinding machines	92	56	72	na	97	18,454	18,902	22,753	na	27,850
Grinding machines	1,098	1,544	3,048	2,371	3,656	50,514	44,911	49,171	97,966	47,662
Grinding wheel mach.	810	2,030	1,086	1,570	1,073	637	406	591	622	789
Polishers	2,536	6,549	4,171	na	5,463	11,098	16,074	12,976	na	12,428
METAL FORMING TOTAL	9,402	13,000	12,130	11,887	17,343	150,161	155,474	138,146	130,493	143,049
CNC presses	37	25	21	na	118	7,113	21,272	8,234	na	11,754
Presses	307	308	286	334	420	20,021	14,356	14,558	28,412	14,415
Bend or straighten	492	534	603	689	1,811	20,497	22,508	27,401	12,961	16,055
Shearing machines	534	473	423	5,725	702	8,193	7,411	7,300	35,646	11,378
Punching machines	3,450	5,038	4,244	na	7,729	18,295	28,808	21,474	na	31,393
Other metal forming	4,580	6,622	6,553	5,139	6,563	76,042	61,119	59,179	26,734	58,052
Slot, broach, thrd. roll.	3,545	9,382	9,498	na	13,762	58,872	136,845	105,075	na	114,527

Source: China Machine Tool and Tool Builders' Association (CMTBA)

Note: na = not available; Individual items may not add up to totals due to rounding

GERMANY

Exports by Type of Machine

(millions of U.S. dollars)

	UNITS				VALUE			
	1988	1989	1990	1991*	1988	1989	1990	1991*
MACHINE TOOL								
TOTAL	161,267	173,503	178,324	159,319	\$4,070.0	\$4,236.8	\$5,016.4	\$5,103.8
of which NC	8,371	8,593	8,832	8,002	1,904.4	1,899.8	2,324.3	2,172.0
METAL CUTTING								
TOTAL	111,309	123,310	128,696	106,264	2,631.9	2,769.3	3,203.6	3,194.3
of which NC	7,369	7,433	7,726	6,874	1,625.3	1,645.1	1,977.2	1,870.6
Physico-chemical	1,932	1,944	2,077	2,257	115.6	152.6	154.7	127.3
of which NC	714	594	597	486	99.5	102.6	102.6	71.6
Machining centers	1,678	1,238	1,306	1,039	512.9	354.7	385.3	338.1
Transfer lines	1,192	112	141	198	325.5	156.2	213.6	314.4
Lathes	5,598	5,952	5,761	7,208	629.3	635.9	701.1	676.7
of which NC	1,994	2,073	2,108	2,040	496.0	504.3	558.7	559.5
Drilling machines	14,211	16,226	13,410	11,223	51.2	63.4	76.6	73.7
of which NC	158	136	155	252	23.0	27.3	36.6	39.7
Milling machines	5,491	6,191	5,993	5,091	334.4	362.2	382.4	325.4
of which NC	1,858	2,049	1,917	1,421	260.3	290.2	305.1	252.7
Shape, slot, saw, cut-off, plane	11,624	14,959	12,574	8,817	141.6	135.4	176.5	162.4
of which NC	210	238	255	216	14.9	16.1	24.6	32.8
Boring, bore-mill	638	555	556	737	125.7	101.4	72.6	76.6
of which NC	220	185	161	159	105.5	83.7	60.1	58.2
Grinding machines	65,199	70,806	82,875	66,269	567.6	568.8	745.0	777.6
of which NC	868	786	961	935	235.1	211.4	357.2	348.3
Gear cutting	755	709	685	904	120.3	127.1	185.8	230.0
of which NC	155	134	210	287	65.6	54.9	112.7	149.6
Threading or tapping	3,389	3,532	2,338	1,895	11.8	12.8	15.2	14.4
Other metal cutting	794	1,086	980	626	21.4	98.7	94.8	77.8
METAL FORMING								
TOTAL	43,226	43,623	47,475	39,433	1,083.2	1,152.6	1,401.7	1,474.3
of which NC	1,002	1,160	1,106	1,128	279.1	254.8	347.1	301.3
Presses	6,604	7,743	8,521	6,848	306.1	336.2	363.0	447.3
of which NC	154	149	145	135	48.8	42.4	47.5	43.3
Bending or forming	12,621	10,705	10,869	9,574	133.2	154.8	179.5	168.2
of which NC	279	344	263	323	41.7	48.6	52.6	57.5
Punching or shearing	16,700	17,884	20,172	14,677	273.0	260.5	336.8	258.5
of which NC	550	643	667	629	173.0	158.1	195.8	156.0
Forging or hammers	372	404	319	286	41.8	47.0	95.7	85.0
of which NC	19	24	31	41	15.6	5.7	27.3	44.6
Drawing machines	767	790	1,087	1,122	82.0	111.0	133.9	164.9
Thread rolling	178	192	173	190	8.4	9.0	17.5	14.7
Wire working mach.	2,510	3,277	3,440	4,354	121.2	137.2	154.0	233.3
Other metal forming	3,474	2,628	2,894	2,382	117.5	96.9	121.4	102.4
Other machine tools	6,732	6,570	2,163	13,622	355.0	314.9	411.0	435.2
Parts & accessories	-	-	-	-	622.6	644.9	830.7	818.4

Source: German Machine Tool Builders' Association (VDW)

Note: *East Germany is included beginning in 1991

GERMANY

NC Exports by Type of Machine

(millions of U.S. dollars)

	UNITS			VALUE		
	1989	1990	1991*	1989	1990	1991*
MACHINE TOOL TOTAL	8,694	8,832	8,002	\$1,899.8	\$2,324.3	\$2,172.0
METAL CUTTING TOTAL	7,534	7,726	6,874	1,645.1	1,977.2	1,870.6
Physico-chemical	594	597	486	102.6	102.6	71.6
EDM	563	569	463	95.0	94.5	68.2
Ultrasonic	2	1	2	0.3	0.2	0.4
Other	29	27	21	7.4	7.9	3.0
Machining centers	1,238	1,306	1,039	354.7	385.3	338.1
Lathes	2,073	2,108	2,040	504.3	558.7	559.5
Horiz. mult. spindle	641	754	659	125.6	169.3	138.3
Horiz. single spindle	625	647	653	145.3	153.9	141.4
Capstan, turret, auto.	524	489	393	119.0	132.3	129.6
Other horizontal	114	75	137	27.2	16.0	24.7
Vertical lathes	108	80	130	74.5	71.6	97.3
Other lathes	61	63	68	12.6	15.6	28.3
Drilling machines	136	155	252	27.3	36.6	39.7
Radial	14	17	33	0.5	1.0	2.0
Multiple-spindle	55	59	87	14.5	19.3	24.1
Other	67	79	132	12.2	16.4	13.6
Milling machines	2,049	1,917	1,421	290.2	305.1	252.7
Knee type	49	49	24	7.7	9.7	3.5
Plano-milling	37	28	16	37.4	8.7	11.4
Tool milling	1,823	1,704	1,128	215.0	237.4	190.5
Other	140	136	253	30.1	49.4	47.3
Sawing or cutting-off	235	251	213	15.4	24.4	32.0
Circular	73	95	94	5.2	11.0	17.9
Other	162	156	119	10.3	13.4	14.1
Planing machines	3	4	3	0.6	0.2	0.8
Grinding machines	786	961	935	211.4	357.2	348.3
Surface	150	252	212	44.7	88.6	82.5
Cylindrical	158	181	234	61.8	126.2	139.6
Tool or cutter	259	281	178	34.7	40.2	29.4
Other	219	247	311	70.2	102.3	96.8
Boring	24	9	6	13.2	2.8	1.2
Boring-milling	161	152	153	70.5	57.3	57.0
Gear machines	134	210	287	54.9	112.7	149.6
Gear finishing	48	86	90	20.7	47.3	45.9
For cylindrical gears	80	114	176	33.3	59.6	89.1
Other gear cutting	6	10	21	0.9	5.8	14.6*
METAL FORMING TOTAL	1,160	1,106	1,128	254.8	347.1	301.3
Forging machines	24	31	41	5.7	27.3	44.6
Presses	149	145	135	42.4	47.5	43.3
Hydraulic	138	135	123	39.8	40.4	36.2
Other	11	10	12	2.6	7.1	7.1
Bending or forming	344	263	323	48.6	52.6	57.5
For flat products	145	140	174	18.2	29.4	30.4
For non-flat products	199	123	149	30.4	23.2	27.1
Punching or shearing	643	667	629	158.1	219.7	156.0
Shears for flat prod.	75	102	95	16.7	51.2	28.8
Shears, not flat products	15	16	23	1.9	3.5	2.4
Punch or notch, flat prod.	533	528	476	137.2	161.6	118.9
Punch or notch, non-flat	20	21	35	2.3	3.3	5.9

Source: German Machine Tool Builders' Association (VDW)

Note: *East Germany is included beginning in 1991

GERMANY

Exports by Destination

(millions of U.S. dollars)

	1987	1988	1989	1990	1991*
TOTAL EXPORTS	\$3,593.0	\$4,070.0	\$4,236.8	\$5,016.4	\$5,103.8
Algeria	6.2	10.4	38.2	30.5	15.6
Argentina	10.2	11.5	6.3	20.6	39.4
Australia	29.3	20.4	25.7	25.7	28.8
Austria	183.3	259.8	204.6	238.1	255.8
Belgium	134.6	125.2	126.8	142.8	269.7
Brazil	45.3	51.1	44.3	53.4	73.5
Bulgaria	83.2	66.5	36.1	11.2	3.5
Canada	111.2	37.9	48.0	51.9	54.5
Chile	0.9	1.7	2.6	3.5	3.4
China	168.4	129.7	160.9	137.7	130.7
Czechoslovakia	55.8	52.5	73.7	67.2	55.9
Denmark	41.3	43.4	37.8	55.7	48.6
Egypt	18.7	3.6	6.1	15.2	12.9
Finland	33.5	30.2	43.4	64.2	26.1
France	259.3	353.5	369.3	542.0	509.9
Greece	6.2	9.5	12.2	11.6	11.3
Hong Kong	3.2	5.7	6.6	4.7	7.4
Hungary	39.8	18.6	21.6	30.9	55.7
India	73.5	67.0	61.6	92.8	84.9
Indonesia	12.6	9.6	10.3	7.5	26.4
Iran	88.3	147.4	97.4	112.3	141.5
Iraq	12.3	94.8	76.7	68.8	-
Ireland	5.8	7.5	9.4	14.8	11.7
Israel	13.5	11.1	5.4	11.2	12.0
Italy	274.7	278.7	337.0	367.6	364.7
Japan	60.5	58.2	94.7	197.3	156.0
Libya	1.2	4.2	1.7	2.5	28.9
Malaysia	1.7	2.1	5.1	8.1	22.3
Mexico	22.3	24.6	14.9	19.7	33.4
Netherlands	118.2	120.7	121.8	162.6	145.7
Norway	20.0	20.7	11.0	13.3	23.2
Poland	45.5	52.5	64.7	95.9	73.4
Portugal	9.8	20.9	15.1	28.4	30.3
Romania	0.6	0.8	(a)	1.6	13.5
Saudi Arabia	6.2	5.7	6.3	12.0	3.3
Singapore	10.2	8.4	15.8	24.2	25.4
South Africa	11.8	22.7	33.2	34.0	42.1
South Korea	63.3	100.0	118.8	112.6	113.1
Soviet Union	296.7	568.0	483.3	432.8	654.9
Spain	55.1	79.7	111.1	223.3	159.8
Sweden	117.5	146.9	196.6	174.2	135.5
Switzerland	225.7	229.1	229.1	308.0	236.9
Taiwan	24.8	31.9	33.7	43.5	31.2
Thailand	4.2	8.0	13.7	17.1	21.4
Turkey	31.7	33.9	31.7	36.8	61.0
United Kingdom	193.1	260.8	245.7	332.7	351.9
United States	407.7	305.5	389.9	425.7	394.7
Venezuela	7.0	12.6	14.2	5.9	6.9
Yugoslavia	100.2	62.1	73.7	63.1	40.1
Other Countries	46.7	42.4	49.0	59.3	55.0

Source: German Machine Tool Manufacturers' Association (VDW)

Note: *East Germany is included beginning in 1991; a = less than \$50,000

GERMANY

Imports by Type of Machine

(millions of U.S. dollars)								
	UNITS				VALUE			
	1988	1989	1990	1991*	1988	1989	1990	1991*
MACHINE TOOL								
TOTAL	425,651	345,909	316,155	489,810	\$1,266.9	\$1,479.2	\$2,131.8	\$2,308.2
of which NC	7,220	8,726	11,322	11,736	666.2	807.9	1,188.8	1,148.9
METAL CUTTING								
TOTAL	388,783	306,268	280,544	446,097	939.3	1,102.2	1,595.6	1,694.5
of which NC	6,454	7,554	9,743	9,875	601.5	706.4	1,036.2	980.0
Physico-chemical	1,829	2,742	3,724	2,271	120.0	165.9	222.3	204.7
of which NC	1,033	1,116	1,277	1,152	99.8	113.7	149.3	124.8
Machining centers	(b)	1,199	1,607	1,420	(b)	134.3	199.6	207.4
Transfer lines	(b)	151	285	345	(b)	25.7	48.6	186.7
Drilling machines	175,857	102,228	75,580	112,843	35.3	30.9	42.1	44.6
of which NC	213	297	360	358	14.0	13.7	20.2	21.4
Milling machines	6,695	4,797	6,580	7,031	91.0	97.1	139.7	143.3
of which NC	803	758	1,287	1,445	50.4	57.1	86.6	89.2
Shape, slot, saw, plane	11,319	10,940	12,995	18,322	25.1	30.4	47.1	57.9
of which NC	149	150	238	651	4.4	4.1	8.9	8.8
Lathes	9,629	10,155	12,887	16,474	224.0	295.6	425.5	396.3
of which NC	2,187	2,736	3,480	3,279	153.2	212.9	308.3	274.5
Boring, bore-mill	1,909	2,917	2,366	2,790	75.8	98.4	130.5	125.6
of which NC	614	617	684	733	60.8	70.2	93.8	82.1
Grinding machines	177,956	168,322	160,125	273,271	193.2	179.9	264.5	241.1
of which NC	605	604	714	744	99.5	85.8	133.7	129.7
Gear cutting	134	159	152	176	24.8	20.5	35.7	51.0
of which NC	43	47	57	63	18.4	14.7	26.0	32.9
Thread or tap	1,099	1,233	2,936	4,892	3.9	3.9	5.9	8.8
Other metal cutting	1,298	1,425	1,307	6,262	7.5	19.5	33.1	27.1
METAL FORMING								
TOTAL	33,190	36,272	33,000	41,331	276.1	316.3	472.5	552.2
of which NC	766	1,172	1,579	1,861	84.7	101.4	152.6	168.9
Forging or hammers	352	529	289	443	10.3	9.9	22.2	31.6
of which NC	17	9	6	16	1.0	0.8	6.8	4.4
Presses	3,904	3,802	3,420	3,346	67.1	64.8	100.9	99.1
of which NC	135	203	64	90	10.4	13.1	17.2	15.5
Bending or forming	6,187	6,677	6,499	10,812	68.2	82.8	125.8	166.7
of which NC	318	554	781	1,127	25.9	40.5	60.3	80.1
Punching or shearing	17,822	19,602	18,998	23,320	70.6	100.7	138.9	153.0
of which NC	296	406	728	628	27.4	47.0	68.3	69.0
Drawing machines	388	1,027	168	221	10.2	7.2	5.3	7.4
Thread rolling	165	150	141	108	3.0	2.5	3.5	4.6
Wire working machines	1,390	1,333	1,503	1,530	26.1	24.1	47.8	62.4
Other metal forming	2,984	3,417	1,982	1,551	20.6	28.9	28.1	27.3
Other machine tools	3,678	3,369	2,611	2,382	51.6	60.7	63.7	61.4
Parts and accessories	-	-	-	-	340.0	369.2	589.8	623.9

Source: German Machine Tool Manufacturers' Association (VDW)

Note: *East Germany is included beginning in 1991; b= combined total is 1,058 units at \$138.7 million

GERMANY

NC Imports by Type of Machine

(millions of U.S. dollars)

	UNITS			VALUE		
	1989	1990	1991*	1989	1990	1991*
MACHINE TOOL TOTAL	8,726	11,322	11,736	\$807.9	\$1,188.8	\$1,148.9
METAL CUTTING TOTAL	7,554	9,743	9,875	706.4	1,036.2	980.0
Physico-chemical	1,116	1,277	1,152	113.7	149.3	124.8
EDM	979	1,136	1,031	96.3	123.7	106.8
Ultrasonic	3	7	-	0.7	0.8	-
Other	134	134	121	16.7	24.9	18.0
Machining centers	1,199	1,607	1,420	134.3	199.6	207.4
Lathes	2,736	3,480	3,279	212.9	308.3	274.5
Horiz. mult. spindle	803	1,043	1,058	70.5	92.2	82.9
Horiz. single spindle	637	461	422	28.0	32.2	28.4
Capstan, turret, auto.	844	1,226	821	80.5	124.7	88.3
Other horizontal	193	261	275	13.4	23.1	27.7
Vertical lathes	43	138	139	4.7	12.5	14.8
Other lathes	216	351	564	15.8	23.6	32.5
Drilling machines	297	360	358	13.7	20.2	21.4
Radial	35	38	80	0.9	0.8	1.5
Multiple-spindle	77	20	66	1.3	1.1	4.9
Other	185	302	212	11.5	18.4	15.0
Milling machines	758	1,287	1,445	57.1	86.6	89.2
Knee type	106	94	111	8.2	9.5	8.6
Plano-milling	20	103	68	3.0	11.4	7.8
Tool milling	351	488	725	25.2	41.9	53.1
Other	281	612	541	20.7	23.8	19.7
Sawing or cutting-off	147	235	650	3.9	7.3	8.8
Circular	53	155	95	0.6	2.8	2.0
Other	94	80	555	3.3	4.5	6.8
Planing machines	3	3	1	0.2	1.6	(a)
Grinding machines	604	714	744	85.8	133.7	129.7
Surface	71	53	50	5.6	9.0	9.2
Cylindrical	289	362	300	46.0	70.3	73.0
Tool or cutter	56	96	131	3.6	4.8	5.3
Other	188	203	263	30.6	49.6	42.3
Boring machines	5	3	7	2.7	0.2	0.5
Boring-milling machines	612	681	726	67.5	93.6	81.6
Gear machines	47	57	63	14.7	26.0	32.9
Gear finishing	27	32	39	13.9	20.4	22.3
For cylindrical gears	2	5	10	0.4	2.8	3.6
Other gear cutting	18	20	14	0.4	2.7	7.0
METAL FORMING TOTAL	1,172	1,579	1,861	101.4	152.6	168.9
Forging machines	9	6	16	0.8	6.8	4.4
Presses	203	64	90	13.1	17.2	15.5
Hydraulic	148	46	71	11.0	7.5	9.8
Other	55	18	19	2.1	9.6	5.7
Bending or forming	554	781	1,127	40.5	60.3	80.1
For flat products	359	446	593	27.1	37.5	48.1
For non-flat products	195	335	534	13.4	22.8	32.0
Punching or shearing	406	728	628	47.0	68.3	69.0
Shears for flat products	61	187	192	2.2	11.3	10.1
Shears not flat products	60	136	79	1.3	3.8	3.0
Punch or notch, flat prod.	211	324	261	33.3	37.7	44.2
Punch or notch, non-flat	74	81	96	10.2	15.4	11.7

Source: German Machine Tool Manufacturers' Association (VDW)

Note: *East Germany is included beginning in 1991; a = less than \$50,000

GERMANY

Production*

(millions of U.S. dollars)

	UNITS					VALUE				
	1987	1988	1989	1990	1991	1987	1988	1989	1990	1991
MACHINE TOOL TOTAL	126,150	129,841	143,599	153,724	154,325	\$6,402.5	\$6,572.2	\$6,867.7	\$8,733.9	\$8,122.5
of which NC	18,965	19,364	21,550	22,131	19,145	3,299.7	3,396.8	3,565.8	4,974.6	4,422.3
METAL CUTTING TOTAL	78,519	80,492	91,640	91,713	90,792	4,652.6	4,728.8	4,783.5	6,238.6	5,685.7
of which NC	18,166	18,597	20,563	20,327	17,439	2,885.4	2,989.0	3,125.5	4,356.4	3,858.1
Physico-chemical machines	782	770	669	824	617	145.5	135.0	116.6	164.5	122.6
Spark erosion	na	na	na	644	504	na	na	na	134.6	99.6
Other physico-chemical	na	na	na	180	113	na	na	na	29.9	23.0
Station type machines	676	1,655	837	886	813	613.1	565.2	429.8	712.2	746.7
Transfer machines	379	370	382	327	343	521.0	457.8	350.4	486.4	533.0
of which NC	125	129	101	143	186	265.4	260.2	171.3	334.4	436.7
Dial index or drum	297	1,285	455	559	470	92.1	107.4	79.4	225.8	213.7
of which NC	38	899	48	51	50	25.2	41.8	24.8	43.9	53.9
Machining centers	1,198	1,372	2,198	2,618	1,766	465.5	500.0	621.1	1,052.1	739.3
For cubical workpieces	na	na	na	1,929	1,536	na	na	na	821.5	585.7
For rotational symm. work.	na	na	na	432	63	na	na	na	98.4	33.5
Special purpose machines	na	na	na	257	167	na	na	na	132.4	120.1
of which NC	na	na	na	76	69	na	na	na	95.9	81.1
Lathes	6,941	6,561	7,068	7,538	6,894	1,048.6	1,059.0	1,099.8	1,303.7	1,201.0
(of which NC)	3,110	2,782	3,396	3,337	2,907	789.6	689.7	750.6	826.2	873.7
Centerless lathes	(b)	3,096	2,874	2,733	2,854	(b)	258.7	281.5	328.9	312.9
of which NC	957	930	1,085	1,207	990	189.8	183.4	210.8	259.5	231.2
Front loading lathes	(b)	(b)	(b)	375	307	(b)	(b)	(b)	160.3	133.6
of which NC	na	na	na	261	190	na	na	na	142.2	115.5
Capstan or turret lathes	533	526	759	1,134	791	91.0	97.2	146.7	194.0	132.1
of which NC	497	484	696	811	585	87.7	92.8	120.1	168.5	114.8
Multi-spindle automatic	611	545	535	314	242	253.4	248.8	232.5	127.6	118.5
of which NC	345	271	249	18	(b)	158.6	144.6	121.8	8.4	(b)
Sngl spindle bar & long										
workpiece automatics	1,357	1,173	1,383	1,355	1,019	226.4	203.1	217.7	260.0	190.3
of which NC	na	na	na	1,064	823	na	na	na	242.0	179.9
Other single spindle auto.	237	192	259	115	105	71.3	69.3	70.1	19.6	28.4
of which NC	na	na	na	34	49	na	na	na	9.1	16.8
Vertical lathes	(b)	(b)	(b)	210	196	(b)	(b)	(b)	142.2	152.5
NC bore & turn mills	na	na	na	124	154	na	na	na	103.8	145.4

(continued)

GERMANY

Production^a
(continued)

(millions of U.S. dollars)

	UNITS					VALUE				
	1987	1988	1989	1990	1991	1987	1988	1989	1990	1991
Other lathes	4,203	1,029	1,258	1,302	1,380	\$406.5	\$181.9	\$151.3	\$71.1	\$132.7
Drilling or boring	16,338	14,733	14,496	14,175	15,262	237.5	245.8	242.5	164.0	244.9
Bench, pillar, column	15,450	13,720	13,523	13,161	14,216	48.7	41.4	35.6	50.1	49.0
Radial drilling	279	215	227	271	321	9.2	7.3	6.9	9.9	13.1
Multi-spindle drilling	45	44	60	45	(c)	5.8	8.8	24.8	11.4	(c)
of which NC	na	21	31	na	na	na	7.6	15.8	na	na
Boring machines	219	294	191	175	176	47.2	62.7	56.1	52.8	49.1
of which NC	na	na	48	62	54	na	na	17.2	13.8	14.7
Boring-milling machines	97	138	147	18	72	86.7	93.0	91.0	14.6	74.5
of which NC	66	77	77	10	54	82.4	86.1	87.4	11.5	65.9
Other drilling or boring	248	322	348	505	476	39.9	32.6	28.1	25.2	59.2
Threading or tapping	2,798	3,557	4,595	5,178	5,372	7.4	9.4	9.9	13.8	14.5
Milling machines	8,136	7,510	8,985	9,375	7,505	637.3	682.6	710.7	890.8	686.8
Knee type milling	867	747	839	858	835	61.0	51.3	57.0	79.4	79.1
of which NC	130	113	108	116	95	10.6	8.8	9.0	14.4	12.0
Circular, bed, or drum	282	182	234	80	157	26.6	18.0	20.4	13.7	11.5
Plano-milling	109	134	196	176	201	90.7	85.3	96.1	104.9	111.0
of which NC	99	126	158	169	174	86.0	83.9	93.5	104.4	105.8
Tool milling	4,716	4,488	4,488	4,542	2,998	387.1	436.6	446.7	581.2	378.5
of which NC	3,629	3,659	3,732	4,088	2,399	338.9	392.8	396.9	550.6	348.5
Copying milling	1,094	1,030	1,926	2,397	2,128	33.3	49.9	41.6	53.3	56.7
of which NC	676	646	372	483	474	28.4	32.1	34.8	45.4	50.2
Other milling	1,068	934	1,302	1,322	1,186	38.7	41.5	48.9	58.3	50.0
of which NC	247	134	112	99	106	43.0	33.6	42.4	48.7	40.7
Grinding machines	16,989	19,965	20,738	25,223	24,430	850.1	827.3	879.3	1,134.4	1,094.5
Plain external cylind.	(g)	(g)	(g)	407	379	(g)	(g)	(g)	138.6	150.1
of which NC	217	163	205	228	na	75.0	66.2	77.8	97.5	na
Centerless external cyl.	(g)	(g)	(g)	128	86	(g)	(g)	(g)	28.6	24.5
of which NC	na	na	na	48	na	na	na	na	15.4	na
Internal cylindrical	200	182	194	132	161	38.5	36.8	39.4	36.9	45.8
Special purpose grinding	979	985	966	1,263	1,415	100.8	97.6	85.6	160.8	159.2
of which NC	106	83	80	146	156	68.5	57.7	57.1	131.0	129.7
Surface grinding	1,828	1,629	2,026	1,733	3,492	180.3	169.6	188.3	207.0	216.9
of which NC	792	717	686	784	686	106.7	97.3	95.1	110.3	123.2

(continued)

GERMANY

Production*
(continued)

(millions of U.S. dollars)

	UNITS					VALUE				
	1987	1988	1989	1990	1991	1987	1988	1989	1990	1991
Tool or cutter grinding	6,524	10,129	9,897	10,188	7,201	\$165.7	\$166.6	\$196.9	\$220.4	\$157.3
of which NC	690	1,020	2,214	1,839	1,250	101.0	102.0	133.1	136.3	100.7
Honing or lapping	535	540	539	614	448	100.4	104.1	91.8	146.8	125.6
of which NC	na	na	na	235	85	na	na	na	84.7	34.9
Other grind or polish	6,389	6,077	6,618	10,758	11,248	131.5	128.3	143.8	195.2	215.2
of which NC	654	734	694	850	1,146	54.6	53.3	55.4	78.9	103.5
Gear cutting machines	1,040	964	919	860	811	233.1	230.8	229.0	310.3	302.5
Gear milling	328	314	340	352	289	96.2	88.0	95.1	127.4	126.4
of which NC	263	200	223	292	241	85.1	70.8	78.4	114.7	113.3
Gear grinding	310	246	251	145	150	78.8	76.2	70.9	99.7	97.3
of which NC	193	163	211	87	104	27.6	37.9	54.4	70.1	71.1
Other gear cutting	402	404	328	363	372	58.1	66.6	63.0	83.2	78.8
of which NC	211	234	193	291	274	27.7	37.3	40.3	69.2	49.1
Broaching machines	146	155	162	148	149	22.7	30.5	24.9	34.0	27.7
of which NC	na	na	na	78	76	na	na	na	2.6	3.8
Planing, shaping, slotting	127	97	113	130	90	4.7	6.0	5.8	5.4	4.0
Sawing or cutting-off	8,856	7,686	9,163	9,677	12,052	120.7	142.3	174.2	229.9	224.0
Circular sawing	1,505	1,715	1,914	2,243	1,974	53.1	63.7	67.6	88.5	82.5
of which NC	na	1,171	1,243	1,441	1,389	na	53.4	52.9	72.0	66.9
Band saws	2,573	1,489	1,927	2,292	2,846	31.0	40.7	50.3	72.4	66.1
of which NC	na	365	530	697	1,241	na	16.9	22.6	34.6	31.3
Other	4,778	4,482	5,322	5,142	7,270	36.5	38.0	56.2	69.0	75.4
Other metal cutting	14,492	15,467	21,697	15,081	15,031	266.4	294.9	240.3	223.5	277.2
METAL FORMING TOTAL	47,631	49,349	51,959	62,011	63,533	1,749.9	1,843.4	2,084.1	2,495.3	2,436.7
of which NC	799	767	987	1,804	1,706	414.3	407.9	440.2	618.3	564.2
Forging or hammers	(d)	(d)	229	279	189	(d)	(d)	20.4	58.5	63.0
of which NC	na	na	na	221	144	na	na	na	22.6	27.5
Presses	13,273	13,988	17,028	16,794	17,250	612.1	603.9	731.0	876.9	896.8
Mechanical presses	11,342	11,654	14,451	13,882	14,670	335.5	307.0	398.2	435.6	452.3
(of which NC)	(h)	(h)	19	82	61	(h)	(h)	55.6	94.6	97.0
W/hand or foot levers	8,478	8,854	9,733	10,046	10,982	3.0	3.3	3.7	4.3	4.6
Eccentric or crank <160t	1,055	1,171	798	909	1,178	67.4	78.8	71.1	95.6	109.4
Eccentric or crank >160t	33	31	43	43	30	33.0	65.8	155.1	154.8	157.5

(continued)

GERMANY

Production*
(continued)

(millions of U.S. dollars)

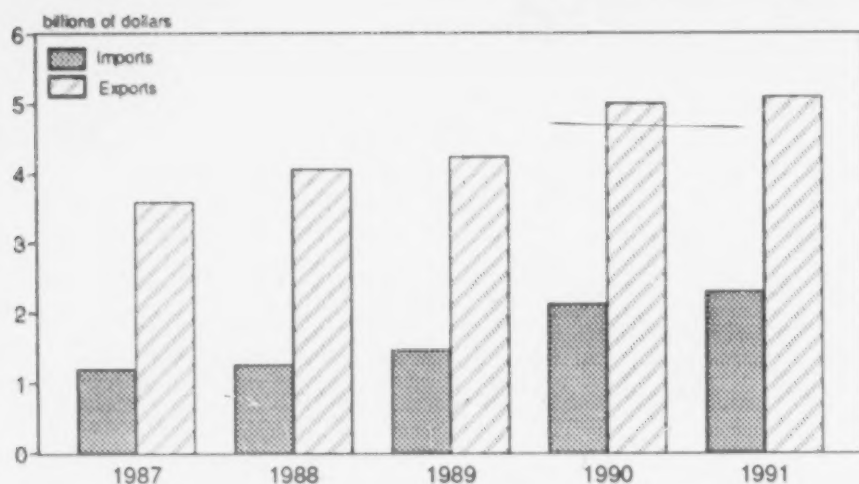
	UNITS					VALUE				
	1987	1988	1989	1990	1991	1987	1988	1989	1990	1991
Blanking presses	187	146	172	158	86	\$ 36.8	\$ 42.4	\$ 41.7	\$ 44.7	\$ 42.5
Toggle or drawing	419	474	723	1,163	1,276	20.7	16.6	19.8	25.3	32.3
Other mechanical	1,170	978	2,982	1,563	1,118	174.6	100.1	106.8	110.9	106.0
Hydraulic presses	1,931	2,334	2,577	2,752	2,465	276.6	296.9	332.7	383.9	400.8
(of which NC)	(h)	(h)	79	67	154	(h)	(h)	34.3	53.3	52.2
Open front	362	365	366	413	417	19.1	16.0	16.6	32.0	35.6
Double and 4-column	526	560	604	726	794	84.1	80.0	75.0	100.2	105.5
Drawing presses	85	145	130	115	157	60.7	81.6	81.1	89.6	110.3
Press brakes	215	219	267	271	282	27.5	26.9	33.7	41.5	46.2
Other hydraulic	743	1,045	1,210	1,227	815	85.2	92.4	126.4	120.6	103.2
Bolt, screw, nut making	(d)	(d)	(d)	160	115	(d)	(d)	(d)	57.4	43.6
Punching or shearing	5,699	5,808	6,761	7,855	8,180	340.5	389.3	443.6	542.3	491.7
(of which NC)	597	605	758	845	na	247.1	271.1	295.7	345.9	na
Foot operated	618	675	790	743	794	2.0	2.3	2.5	2.5	2.6
Mechanical shears	na	na	na	3,137	2,507	na	na	na	63.1	37.9
of which NC	na	na	na	90	100	na	na	na	19.1	15.1
Hydraulic shears	na	na	na	1,576	2,534	na	na	na	104.7	150.7
Notching or nibbling	na	na	na	2,400	2,347	na	na	na	369.0	300.5
Sheet metal working	10,518	10,952	8,161	19,320	11,367	295.4	310.7	239.2	406.4	403.4
Bend, fold, straighten	4,111	4,055	4,018	3,906	4,235	91.6	110.0	122.7	120.3	145.4
Flange, bead, seam, curl	2,427	2,680	2,117	2,820	3,106	10.0	15.7	11.8	15.5	12.8
Pipe, rod, shaft bending	2,219	2,177	(d)	2,559	2,258	94.1	87.2	(d)	170.8	136.2
Spin, planish, press thread	193	154	633	120	128	38.9	33.8	47.5	30.2	41.1
of which NC	na	na	na	47	60	na	na	na	24.3	36.3
Rolling mills	327	332	362	266	287	21.9	19.9	21.3	39.7	44.8
Other sheet metal working	1,241	1,554	1,031	9,649	1,353	38.9	44.1	35.9	29.8	23.1
Rivet making machines	746	664	654	74	186	3.5	3.4	3.1	3.9	3.7
Drawing machines	461	462	634	878	648	52.9	55.0	64.6	103.2	109.0
Wire working machines	15,509	16,094	15,322	14,470	22,816	249.0	267.8	284.0	369.4	328.0
Wire rope or cable making	1,011	1,016	932	999	1,092	46.7	57.9	44.4	60.6	72.5
Wire bending or forming	163	53	73	54	48	9.2	5.0	7.6	7.7	9.6
Other wire working	14,335	15,025	14,317	13,417	21,676	193.1	204.9	232.0	301.1	245.9
Thread rolling machines	(d)	(d)	236	217	178	(d)	(d)	13.3	19.5	18.1
Other metal forming	1,425	1,381	2,934	2,124	2,719	196.5	213.3	284.9	115.2	123.0

Source: German Machine Tool Manufacturers' Association (VDW).

Note: * = Figures are for West Germany only; b = included in "other lathes"; c = included in "other drilling"; d = included in "other metal forming"; g = total external cylindrical grinding production in 1987 was 534 machines at \$132.9 million; in 1988, 423 machines at \$124.2 million; in 1989, 498 machines at \$133.4 million; h = total NC press production in 1987 was 82 units at \$104.6 million; in 1988, 68 units at \$92.4 million; na = not available

GERMANY

Imports by Country of Origin



(millions of U.S. dollars)

	1987	1988	1989	1990	1991*
TOTAL IMPORTS	\$1,204.3	\$1,266.9	\$1,479.2	\$2,131.8	\$2,308.2
Switzerland	395.1	370.0	396.9	569.3	575.3
Italy	155.0	145.0	165.8	305.2	333.6
Japan	186.1	247.1	307.6	377.6	332.2
United Kingdom	49.3	70.3	71.8	122.7	190.2
United States	54.4	65.0	80.6	102.3	152.9
Austria	66.9	60.6	78.3	119.1	132.6
France	50.6	46.3	70.5	94.0	104.9
Spain	41.0	41.9	55.8	84.0	70.8
Netherlands	33.6	36.8	40.6	53.6	51.2
Taiwan	24.8	30.2	34.1	41.5	47.4
Sweden	39.5	34.9	32.2	52.2	46.0
Belgium-Luxembourg	28.3	29.6	27.7	41.2	41.1
Czechoslovakia	11.7	11.2	15.2	18.1	34.3
Denmark	9.6	15.2	14.0	21.9	29.3
China	9.2	10.3	14.8	17.0	27.5
Hungary	5.4	7.3	7.8	9.2	19.3
Brazil	4.6	2.5	8.1	13.7	16.0
Yugoslavia	5.9	5.4	8.5	13.5	13.0
USSR	5.9	6.8	10.7	10.8	10.8
Poland	4.9	3.6	5.3	9.6	9.3
Canada	0.3	1.5	1.6	2.1	8.7
Other Countries	22.3	25.4	31.3	53.3	61.6

Source: German Machine Tool Manufacturers' Association (VDW)

Note: *East Germany is included beginning in 1991

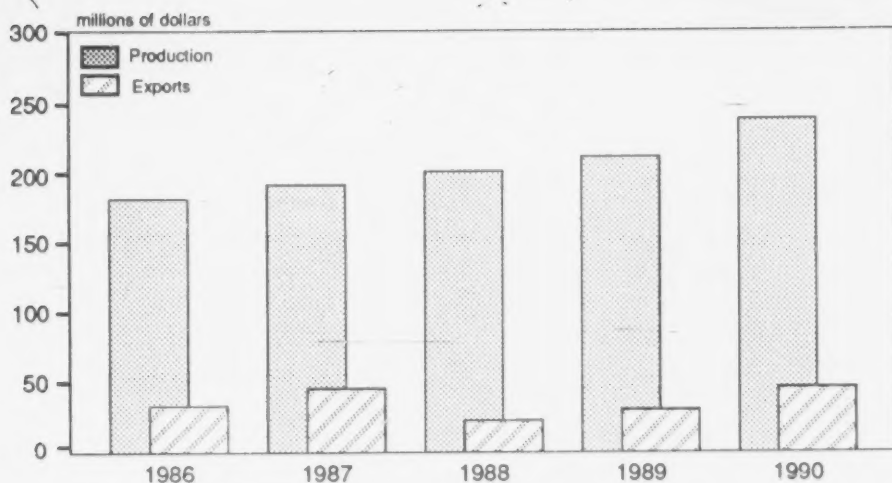
	UNITS				VALUE			
	1988	1989	1990	1991p	1988	1989	1990	1991p
MACHINE TOOL TOTAL	8,543	7,918	8,970	9,886	\$200.0	\$210.6	\$237.3	\$202.7
EDM, spark erosion	119	122	236	290	4.3	4.8	7.9	7.5
of which NC wire	30	35	64	90	2.8	3.0	5.4	5.3
Machining centers	71	96	105	115	19.7	25.2	23.9	20.5
Vertical	na	44	70	75	na	7.6	11.0	9.5
Horizontal	na	52	35	40	na	17.5	12.8	11.0
Lathes	3,241	3,174	3,039	3,335	66.8	69.1	81.7	68.8
of which NC	124	271	281	325	18.5	30.3	34.6	29.0
Boring, bore-mill	111	199	91	107	10.1	11.9	8.6	7.5
of which NC	28	9	13	17	2.0	1.8	1.8	1.8
Milling machines	1,072	1,280	1,484	1,635	14.1	15.7	25.2	21.6
of which NC	8	17	33	35	0.7	1.6	3.3	2.9
Drilling machines	1,188	651	1,297	1,406	8.5	5.8	7.9	6.8
of which NC	2	10	5	6	0.1	0.7	1.2	1.1
Grinding machines	1,263	1,024	1,324	1,414	18.5	16.0	20.9	17.9
of which NC	6	6	15	19	1.8	1.2	3.6	3.1
Planing machines	15	8	5	6	1.0	1.9	1.2	1.1
Broaching machines	20	14	22	25	0.7	0.3	1.0	0.9
Slotting machines	12	1	24	30	0.2	(a)	0.5	0.4
Shaping machines	70	57	3	5	0.6	0.3	(a)	(a)
Thread or tap	32	45	61	70	0.5	0.6	0.6	0.5
Sawing or cut-off	184	116	175	195	0.6	0.3	0.6	0.5
Gear cutting	53	63	79	87	3.2	4.0	3.8	3.5
Die casting machines	17	11	9	10	2.3	1.6	1.3	1.1
Bending or forming	97	102	117	126	2.0	3.8	3.2	3.0
Press brakes	19	25	17	21	0.6	0.9	0.9	0.9
Folding machines	18	29	30	30	(a)	(a)	0.1	(a)
Bend or strght.	60	48	41	45	1.3	2.9	1.5	1.3
NC pipe bending	-	-	29	30	-	-	0.7	0.7
Presses	432	358	447	495	13.7	19.5	22.3	18.7
Punching or shearing	58	57	46	55	1.8	1.5	1.5	1.5
Nibbling	13	17	10	10	0.1	0.1	0.1	(a)
Punch, shear, crop	43	34	36	40	1.5	1.3	1.4	1.3
NC shearing	2	6	-	5	0.2	0.1	-	0.1
Forging or swaging	15	18	8	10	1.4	3.2	0.3	0.3
Wire working machines	-	50	7	10	-	0.3	0.1	0.1
Other machine tools	473	472	391	460	29.7	24.8	24.9	20.7

Source: Indian Machine Tool Manufacturers' Association (IMTMA)

Note: p = preliminary; a = less than \$50,000; na = not available

INDIA

Production and Exports



INDIA

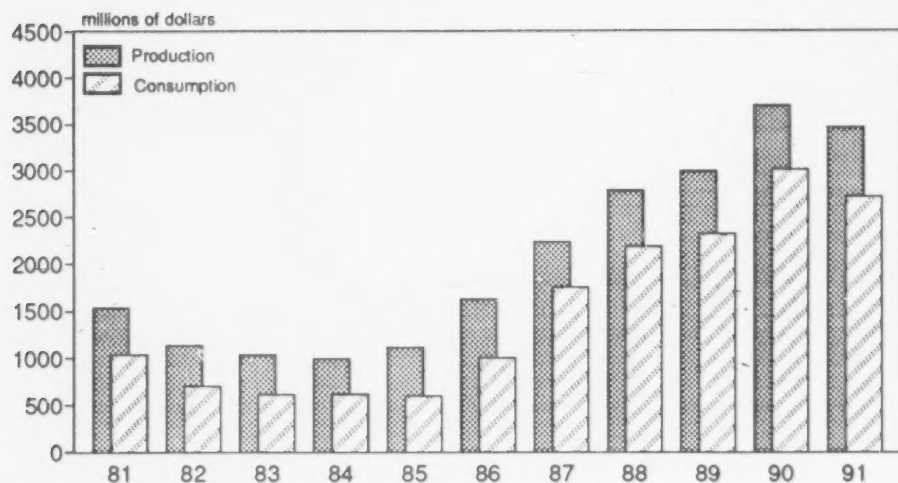
Exports by Type of Machine

(millions of U.S. dollars)

	1986	1987	1988	1989	1990
MACHINE TOOL TOTAL	\$33.4	\$45.7	\$22.6	\$30.4	\$46.2
Lathes	11.6	7.8	8.1	14.2	10.8
Boring machines	1.7	2.4	0.1	(a)	0.2
Broaching machines	—	0.3	—	(a)	—
Drilling machines	0.3	0.7	0.3	0.4	0.6
Grinding machines	10.8	8.8	6.9	1.9	3.9
Milling machines	4.0	6.9	2.7	5.5	11.0
Threading machines	0.4	0.2	0.1	(a)	—
Sawing or cutting-off	(a)	(a)	(a)	(a)	0.2
Shaping machines	—	(a)	0.2	(a)	—
Gear cutting machines	—	0.8	1.6	1.8	3.9
EDM, spark erosion	(a)	0.3	1.8	2.4	3.8
Machining centers	3.4	7.0	—	—	0.4
Presses	0.8	(a)	0.1	3.5	11.4
Shearing machines	(a)	(a)	—	(a)	(a)
Wire forming machines	0.1	0.4	0.5	0.3	—
Other machine tools	0.2	0.1	0.3	0.3	0.1

Source: Indian Machine Tool Manufacturers' Association (IMTMA)

Note: a = less than \$50,000



(millions of U.S. dollars)

	Production	Imports	Exports	Consumption	% Import Penetration	Exports as % of Prod.	Employment
1975	\$842.5	\$212.9	\$432.1	\$623.3	34.2%	51.3%	na
1976	750.9	160.5	359.0	552.4	29.1	47.8	na
1977	878.3	192.9	442.4	628.8	30.7	50.4	na
1978	1,060.5	195.0	596.3	659.2	29.6	56.2	na
1979	1,354.0	255.9	689.0	920.9	27.8	50.9	na
1980	1,728.1	356.4	847.6	1,236.9	28.8	49.0	37,200
1981	1,539.4	300.3	795.2	1,044.5	28.8	51.7	36,000
1982	1,138.6	208.6	639.9	707.3	29.3	56.2	33,800
1983	1,037.0	181.8	603.4	615.4	29.0	58.2	30,800
1984	996.0	182.5	558.0	620.5	29.4	56.0	28,500
1985	1,115.5	196.4	707.4	604.5	32.5	63.4	28,200
1986	1,624.6	346.8	969.7	1,001.7	34.6	59.7	28,700
1987	2,235.2	566.5	1,048.5	1,753.2	32.3	46.9	30,500
1988	2,792.7	706.1	1,309.4	2,189.4	32.2	46.9	31,000
1989	3,004.9	794.6	1,472.7	2,326.8	34.1	49.0	32,100
1990	3,705.9	1,054.3	1,740.0	3,020.2	34.9	47.0	32,000
1991p	3,470.1	872.9	1,624.7	2,718.3	32.1	46.8	31,500

Source: Italian Machine Tools, Robot and Automation Manufacturers' Association (UCIMU)

Note: p = preliminary; na - not available

ITALY

Production

(millions of U.S. dollars)

	1986	1987	1988	1989	1990
MACHINE TOOL TOTAL	\$1,624.6	\$2,235.2	\$2,792.7	\$3,004.9	\$3,705.9
METAL CUTTING TOTAL	1,166.5	1,660.4	2,029.6	2,166.3	2,662.5
Lathes	\$199.3	\$289.4	\$365.5	387.1	433.3
of which NC	134.3	196.1	257.0	268.8	278.9
Milling machines	149.9	212.7	213.0	288.9	372.2
of which NC	124.6	179.0	187.0	265.1	328.4
Boring, boring-milling	44.3	81.2	80.1	61.7	114.3
Drilling machines	26.4	43.4	52.9	57.9	87.4
Machining centers	175.5	270.4	328.0	370.5	404.6
Grinding machines	111.1	171.1	196.7	173.4	243.2
Tool or cutter	10.5	13.2	17.1	(a)	(a)
Sawing or cutting-off	58.1	78.4	104.3	122.1	154.2
Transfer machines	184.7	289.6	330.6	326.0	373.4
Gear cutting machines	23.1	22.1	32.9	49.7	59.8
Other metal cutting	194.3	202.1	325.8	329.0	419.9
METAL FORMING TOTAL	458.1	574.8	763.1	838.6	1,043.3
Presses	115.8	173.7	216.7	227.1	262.4
of which hydraulic	na	na	na	na	69.1
Bending machines	32.5	47.6	63.8	45.3	53.5
Punching or shearing	47.0	63.4	111.0	114.9	150.2
Forging machines	8.1	9.6	20.4	12.0	13.7
Folding machines	29.2	43.4	44.4	(b)	(b)
Bolt, screw, nut making	18.6	23.0	31.4	(b)	(b)
Wire working machines	28.4	48.5	49.9	45.5	49.4
Other metal forming	178.5	165.7	225.6	393.8	514.1

Source: Italian Machine Tools, Robot and Automation Manufacturers' Association (UCIMU)

Note: a = included in "other metal cutting"; b = included in "other metal forming"; na = not available

ITALY

Exports by Type of Machine

(millions of U.S. dollars)

	1987	1988	1989	1990	1991
MACHINE TOOL TOTAL	\$1,048.5	\$1,309.4	\$1,472.7	\$1,740.0	\$1,624.7
METAL CUTTING TOTAL	578.5	799.5	885.5	1,013.2	950.4
Physico-chemical	2.2	57.0	33.5	34.8	33.6
Machining centers	(b)	15.4	55.8	77.5	88.8
Single station transfer	(b)	5.9	6.2	5.1	2.2
Multi-station transfer	(b)	77.6	122.1	72.7	62.2
Lathes	95.4	130.1	136.9	188.6	190.6
of which NC	50.1	67.8	58.9	99.9	na
Way type unit heads	na	(c)	16.5	19.9	(c)
Drilling machines	35.9	66.7	41.3	46.9	47.4
of which NC	19.6	19.7	20.2	23.6	na
Boring or boring-milling	36.1	53.2	57.7	76.0	63.7
of which NC	20.9	27.7	27.7	40.5	na
Milling machines	126.5	115.3	103.9	126.9	102.3
of which NC	81.9	66.8	45.1	33.8	na
Threading or tapping	2.5	15.6	14.8	9.3	7.5
Grinding machines	100.8	139.3	166.4	174.2	157.2
Surface grinding	na	na	42.3	41.0	na
Other grinding	na	na	85.6	107.0	na
Tool or cutter	na	10.0	7.1	13.2	7.7
Honing or lapping	na	9.6	10.3	13.8	18.2
Other	(b)	9.7	21.1	21.3	(b)
Planing machines	1.4	2.1	1.8	3.3	3.7
Shaping or slotting	1.8	1.7	1.4	1.5	2.8
Broaching machines	6.7	6.5	9.2	10.8	17.9
Gear cutting machines	8.5	15.6	22.7	22.0	17.7
of which NC	0.8	3.7	2.3	2.5	na
Sawing or cutting-off	46.1	51.7	67.4	84.0	74.5
Other metal cutting	114.6	45.8	27.9	37.6	60.2
METAL FORMING TOTAL	470.0	509.9	587.0	726.8	674.2
Sheet metal center, straighten or level	(d)	9.2	10.0	18.8	10.5
Sheet metal bending	(d)	7.5	8.4	18.4	18.0
Bending machines	(d)	6.4	6.1	12.1	5.4
Forging machines	9.4	26.1	48.3	51.8	50.6
of which NC	na	4.2	6.5	7.2	na
Presses	123.6	146.0	168.7	205.4	195.6
of which hydraulic	na	na	51.6	67.0	na
Punching or notching	(d)	21.7	34.1	47.8	37.4
of which NC	na	na	20.6	33.2	na
Shearing machines	(d)	30.0	41.6	55.3	54.9
of which NC	na	na	6.3	16.1	na
Wire drawing machines	26.3	46.4	37.3	56.3	41.3
Thread rolling machines	3.2	4.8	4.3	4.1	2.8
Wire working machines	18.5	16.2	22.6	36.7	27.3
Other forming machines	241.3	195.7	205.6	220.2	230.3

Source: Italian Machine Tools, Robot and Automation Manufacturers' Association (UCIMU)

Note: b = included in "other metal cutting"; c = included in "drilling machines"; d = included in "other metal forming"; na = not available

ITALY

Exports by Destination

(millions of U.S. dollars)

	1987	1988	1989	1990	1991
TOTAL EXPORTS	\$1,048.5	\$1,309.4	\$1,472.7	\$1,740.0	\$1,624.7
Germany	157.0	155.3	181.8	316.5	329.4
France	136.3	161.0	193.0	268.6	251.1
Spain	53.2	72.2	70.0	90.0	82.5
USSR	77.2	126.8	114.9	95.6	80.1
United States	85.9	107.5	101.0	101.3	79.4
Turkey	19.7	25.2	19.3	25.3	58.8
Switzerland	53.2	46.3	62.3	76.3	58.7
United Kingdom	38.3	54.6	60.2	77.8	54.5
China	28.5	28.6	43.8	55.5	46.3
Belgium-Luxembourg	19.1	26.8	32.6	38.2	37.1
Poland	9.9	12.1	39.8	78.9	30.9
Portugal	9.4	17.3	20.6	28.8	24.3
Brazil	16.7	12.7	16.0	22.3	22.4
Austria	19.7	19.5	16.4	22.6	20.1
Netherlands	16.7	15.7	14.7	23.5	19.7
Japan	7.6	11.9	17.0	21.6	19.3
Sweden	27.1	31.9	74.2	25.5	18.4
Greece	9.2	12.1	16.1	17.6	18.4
Canada	16.2	22.6	(b)	(b)	16.3
Yugoslavia	13.8	11.3	23.1	25.8	15.6
Venezuela	13.4	26.2	11.4	14.3	13.4
Mexico	5.4	2.8	9.6	13.3	12.6
Finland	6.7	9.7	19.5	16.7	11.3
East Germany	10.1	37.3	52.2	(c)	(c)
Other Countries	198.2	262.0	264.2	284.0	304.1

Source: Italian Machine Tools, Robot and Automation Manufacturers' Association (UCIMU)

Note: b = included in "Other Countries"; c = included in "Germany"

ITALY

Imports by Type of Machine

(millions of U.S. dollars)

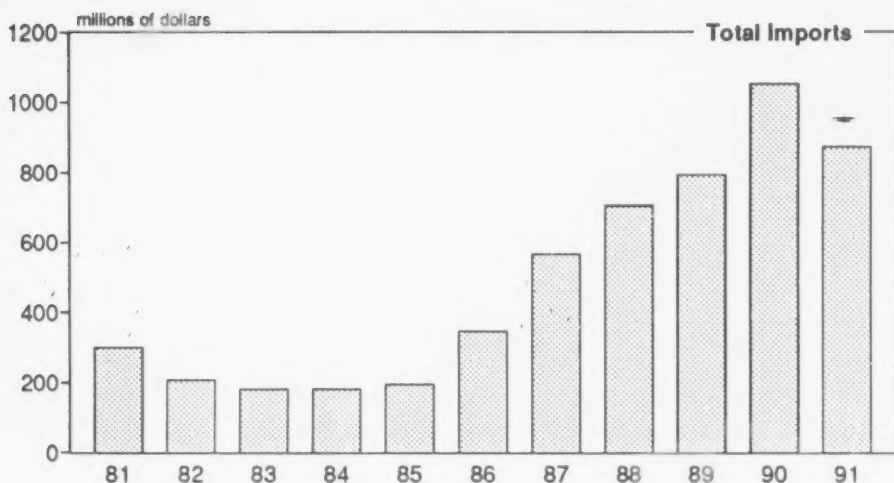
	1987	1988	1989	1990	1991
MACHINE TOOL TOTAL	\$566.5	\$706.1	\$794.6	\$1,054.3	\$872.9
METAL CUTTING TOTAL	421.1	516.0	589.5	806.8	648.3
Physico-chemical machines	47.8	81.2	80.5	128.5	85.4
Machining centers	(a)	64.8	88.2	121.6	84.5
Unit construction	(a)	0.9	3.1	2.6	4.8
Multi-station transfer	(a)	12.4	13.3	30.9	34.2
Lathes	118.9	133.0	166.5	195.6	157.6
of which NC	81.0	94.3	118.0	137.4	na
Way type unit heads	(c)	(c)	1.2	1.7	(c)
Drilling machines	22.3	15.7	13.7	18.6	17.7
of which NC	15.0	4.5	5.4	5.3	na
Boring or boring-milling	17.9	19.7	19.8	28.2	17.8
of which NC	11.8	13.1	11.0	19.0	na
Milling machines	70.5	67.9	84.0	96.8	69.9
of which NC	43.9	41.3	50.5	58.2	na
Threading or tapping	3.8	6.9	5.9	8.5	5.7
Grinding machines	51.2	68.7	72.3	121.6	86.9
Surface or other	na	52.4	42.5	90.5	64.4
Tool or cutter	na	8.4	15.8	16.3	8.7
Honing or tapping	na	7.9	6.4	5.2	13.8
Other	(a)	(a)	7.6	9.6	(a)
Planing machines	1.7	0.7	0.3	0.8	0.6
Shaping or slotting	2.3	0.6	0.6	0.5	0.3
Broaching machines	0.3	0.6	0.3	0.8	2.3
Gear cutting machines	16.5	16.8	21.4	30.4	53.9
of which NC	9.0	7.4	10.8	14.4	na
Sawing or cutting-off	14.9	12.9	12.9	13.1	10.3
Other metal cutting	54.7	13.3	5.6	6.6	17.2
METAL FORMING TOTAL	145.5	190.1	205.1	247.4	224.6
Forging machines	6.2	15.7	17.4	19.3	10.9
of which NC	na	0.2	1.9	6.3	na
Sheet metal center,					
straighten or level	(e)	8.4	8.6	9.8	15.0
Sheet metal bending	(e)	2.4	1.2	2.2	5.9
Bending machines	(e)	2.4	0.9	4.3	2.1
Presses	29.3	45.7	73.5	63.3	58.4
of which hydraulic	na	na	21.1	19.3	na
Wire drawing machines	4.6	16.3	12.0	16.2	9.3
Thread rolling machines	1.5	0.7	1.0	1.1	2.7
Wire forming machines	7.4	5.5	6.2	7.8	7.9
Punching or notching	(d)	38.4	40.4	49.8	35.9
of which NC	(d)	(d)	31.0	40.0	na
Shearing machines	(d)	6.8	8.3	16.0	13.6
of which NC	(d)	(d)	3.4	7.8	na
Other metal forming	66.3	47.9	35.6	57.5	62.8

Source: Italian Machine Tools, Robot and Automation Manufacturers' Association (UCIMU)

Note: a = included in "other metal cutting"; c = included in "drilling machines"; d = imports of punching, shearing or notching machines combined were \$30.2 million in 1988; imports of NC machines in 1987 were \$19.4 million; in 1988, \$33.3 million; e = included in "other metal forming"; na = not available

ITALY

Imports by Country of Origin



(millions of U.S. dollars)

	1987	1988	1989	1990	1991
TOTAL IMPORTS	\$566.5	\$706.1	\$794.6	\$1,054.3	\$872.9
Germany	214.8	255.6	309.4	375.6	328.0
Switzerland	103.8	111.8	102.8	154.1	139.7
Japan	54.5	84.3	101.9	152.1	90.7
France	20.9	41.6	43.5	57.8	47.1
United States	20.5	21.8	30.9	40.9	34.0
Taiwan	10.5	21.1	34.8	43.2	29.2
United Kingdom	29.1	38.8	36.7	42.1	27.6
Belgium-Luxembourg	17.9	20.9	21.5	23.9	27.3
Netherlands	5.4	7.7	7.0	9.7	23.1
Spain	14.8	17.4	19.3	28.2	23.0
Austria	18.1	9.2	11.7	18.1	18.2
Czechoslovakia	8.5	15.2	7.8	9.8	17.2
Sweden	9.2	9.1	6.6	10.0	8.5
USSR	8.2	8.9	10.4	13.6	7.9
East Germany	10.6	13.7	16.7	17.5	(c)
Other Countries	19.7	29.0	33.6	57.7	51.4

Source: Italian Machine Tools, Robot and Automation Manufacturers' Association (UCIMU)

Note: c = included in "Germany"

JAPAN

Metal Cutting Industry Overview

(millions of U.S. dollars)

	Production	Imports	Exports	Consumption	% Import Penetration	Exports as % of Prod.
1971	\$755.4	\$113.6	\$80.1	\$788.9	14.4%	10.6%
1972	679.4	74.1	90.8	662.7	11.1	13.0
1973	1,120.1	78.3	129.3	1,069.1	7.3	11.5
1974	1,230.2	127.6	197.8	1,160.0	11.0	16.1
1975	777.4	72.7	207.6	642.5	11.3	26.7
1976	770.9	46.8	256.5	561.2	8.3	33.3
1977	1,165.1	58.5	430.1	793.5	7.4	36.9
1978	1,736.7	93.3	770.4	1,059.6	8.8	44.4
1979	2,208.9	119.6	942.8	1,385.7	8.6	42.7
1980	3,008.2	168.6	1,188.9	1,987.9	8.5	39.5
1981	3,860.3	175.1	1,409.2	2,626.2	6.7	36.5
1982	3,143.0	175.0	994.1	2,323.9	7.5	31.6
1983	2,956.7	136.9	999.7	2,093.9	6.5	33.8
1984	3,711.2	123.2	1,319.9	2,514.5	4.9	35.6
1985	4,406.5	147.5	1,656.1	2,897.9	5.1	37.6
1986	5,337.1	197.3	2,157.6	3,376.8	5.8	40.4
1987	4,762.0	152.6	2,049.0	2,865.6	5.3	43.0
1988	6,875.3	286.6	2,508.7	4,653.2	6.2	36.5
1989	8,257.5	366.0	3,106.6	5,516.9	6.6	37.6
1990	9,002.0	473.8	3,148.0	6,327.8	7.5	35.0
1991	9,395.0	434.3	3,057.7	6,771.6	6.4	32.5

Source: Japan Ministry of International Trade and Industry; Japan Ministry of Finance

JAPAN

Metal Forming Industry Overview

(millions of U.S. dollars)

	Production	Imports	Exports	Consumption	% Import Penetration	Exports as % of Prod.
1971	\$202.0	\$40.6	\$34.3	\$208.3	19.5%	17.0%
1972	216.3	29.2	54.9	190.6	15.3	25.4
1973	360.1	31.6	86.4	305.3	10.4	24.0
1974	420.0	48.6	109.8	358.8	13.5	26.1
1975	284.8	51.3	105.6	230.5	22.3	37.1
1976	294.6	24.1	113.4	205.3	11.7	38.5
1977	438.0	27.5	186.0	279.5	9.8	42.5
1978	613.7	26.8	241.1	399.4	6.7	39.3
1979	687.1	45.0	286.6	445.5	10.1	41.7
1980	818.0	52.5	264.0	606.5	8.7	32.3
1981	936.8	40.4	276.3	700.9	5.8	29.5
1982	653.3	45.3	269.3	429.3	10.6	41.2
1983	588.2	34.1	254.3	368.0	9.3	43.2
1984	761.7	58.4	419.3	400.8	14.6	55.0
1985	910.2	71.5	522.9	458.8	15.6	57.4
1986	1,535.5	75.0	905.8	704.7	10.6	59.0
1987	1,620.6	111.7	985.8	746.5	15.0	60.8
1988	1,793.6	110.5	919.3	984.8	11.2	51.3
1989	1,801.3	142.5	822.2	1,121.6	12.7	45.6
1990	1,944.1	178.2	831.7	1,290.6	13.8	42.8
1991	2,237.3	199.6	917.7	1,519.2	13.1	41.0

Source: Japan Ministry of International Trade and Industry; Japan Ministry of Finance

JAPAN

Production

(millions of U.S. dollars)

	UNITS					VALUE				
	1987	1988	1989	1990	1991	1987	1988	1989	1990	1991
MACHINE TOOL TOTAL	147,637	198,988	209,685	229,676	201,930	\$6,382.6	\$8,668.9	\$10,058.8	\$10,946.1	\$11,632.3
METAL CUTTING TOTAL	125,536	169,326	177,972	196,131	172,034	4,762.0	6,875.3	8,257.5	9,002.0	9,395.0
of which NC	35,460	47,650	58,042	61,965	52,380	3,364.7	4,842.9	6,029.1	6,812.3	6,810.2
EDM	5,064	6,140	6,923	6,939	5,965	453.2	589.4	634.1	642.0	640.6
NC die sinking	1,597	1,724	1,946	2,090	na	149.2	163.0	183.7	203.4	na
NC wire	3,147	4,095	4,569	4,565	na	284.5	398.4	421.0	416.5	na
Other EDM	320	321	408	284	296	19.5	28.0	29.4	22.2	35.6
Machining centers	9,027	11,474	14,828	15,820	13,766	1,160.3	1,613.8	2,074.5	2,315.2	2,289.4
Vertical	5,869	7,712	9,861	10,092	9,028	547.8	770.5	940.7	963.7	938.3
Y-axis < 500mm	4,031	5,628	7,156	7,096	na	298.7	470.9	565.2	560.0	na
Y-axis > 500mm	1,838	2,084	2,705	2,996	na	249.1	299.6	375.5	403.7	na
Horizontal	2,345	2,692	3,416	4,066	3,501	462.2	609.2	801.8	935.7	914.6
Table < 500mm	894	959	1,369	1,575	na	115.2	147.4	235.0	257.3	na
Table > 500mm	1,451	1,733	2,047	2,491	na	347.0	461.8	566.8	678.4	na
Other	812	1,060	1,551	1,662	1,237	150.0	227.2	332.0	415.8	435.8
Transfer machines	3,476	5,074	5,138	5,653	5,970	570.6	808.2	954.9	1,106.2	1,590.1
of which NC	1,140	1,640	1,640	2,087	2,326	198.8	283.7	335.0	539.9	767.6
Lathes	21,066	28,257	32,748	32,659	26,216	1,230.9	1,771.6	2,039.1	2,192.2	1,941.2
NC	15,241	20,942	24,491	25,406	19,749	1,079.3	1,585.6	1,824.2	1,994.3	1,749.0
Vertical	618	733	830	953	1,020	76.1	93.3	120.9	154.5	197.5
Horizontal	14,623	20,209	23,661	24,453	18,729	1,003.2	1,492.4	1,703.3	1,839.8	1,551.5
Non-NC	5,825	7,315	8,257	7,253	6,467	151.6	186.0	214.9	197.8	192.3
Center	2,224	3,110	3,644	3,519	3,421	52.8	83.3	97.1	95.7	101.0
Automatic	2,515	2,536	2,522	1,899	1,665	82.3	82.0	90.4	74.7	68.3
Other	1,086	1,669	2,091	1,835	1,381	16.5	20.7	27.4	27.4	23.0
Drilling machines	23,206	31,731	37,705	38,670	32,449	101.3	175.1	210.3	240.1	237.5
NC	1,597	2,438	3,045	3,639	2,929	63.2	120.7	146.3	171.5	152.9
Non-NC	21,609	29,293	34,660	35,031	29,520	38.0	54.4	63.9	68.6	84.6
Radial	225	241	205	214	238	5.2	7.1	7.0	8.2	11.9

(continued)

JAPAN

Production
(continued)

(millions of U.S. dollars)

	UNITS					VALUE				
	1987	1988	1989	1990	1991	1987	1988	1989	1990	1991
Multi-spindle	359	370	441	389	323	\$ 11.6	\$ 13.9	\$ 15.6	\$ 16.6	\$ 23.0
Bench-type	19,125	26,546	31,344	31,777	na	10.9	19.4	24.7	26.1	na
Other	1,900	2,136	2,670	2,651	na	10.3	14.0	16.6	17.7	na
Boring machines	871	1,223	1,447	1,501	1,480	95.8	151.8	193.6	204.1	229.4
NC	168	195	445	451	478	53.7	75.2	137.3	146.5	171.5
Non-NC horizontal	97	188	68	56	na	20.3	44.2	19.9	19.1	na
Non-NC jig boring	374	548	599	649	na	16.2	24.5	24.8	26.8	na
Other non-NC	232	292	335	345	na	5.5	8.0	11.6	11.7	na
Milling machines	4,859	6,959	8,612	8,492	7,584	258.1	379.2	477.5	469.1	450.6
NC	1,811	2,319	2,933	2,949	2,707	172.5	235.5	304.4	300.1	284.3
Non-NC	3,048	4,640	5,679	5,543	4,877	85.6	143.7	173.1	169.0	166.2
Bed-type	596	1,109	1,485	1,489	na	22.6	46.9	58.0	58.0	na
Knee-type	1,813	2,792	3,384	3,201	2,869	43.3	74.4	87.5	83.4	83.1
Profile	425	402	445	529	385	11.8	11.5	16.4	15.9	12.6
Other	214	337	365	324	na	7.9	10.9	11.2	11.7	na
Grinding machines	8,631	11,667	12,740	13,424	12,308	559.8	853.0	1,035.6	1,109.9	1,205.6
NC	939	1,447	1,929	2,428	2,423	131.6	221.9	353.5	434.4	477.3
Non-NC	7,692	10,220	10,811	10,996	9,885	428.2	631.1	682.1	675.5	727.3
External cylind.	1,089	1,540	1,731	1,716	1,508	89.1	131.5	147.6	143.0	186.3
Internal cylind.	419	503	460	346	237	38.1	62.0	49.7	32.5	27.5
Surface	3,487	4,336	3,925	4,141	3,566	127.3	203.4	185.7	208.6	200.4
Centerless	606	796	954	948	875	52.5	87.8	118.6	116.7	121.7
Honing or lapping	340	381	419	362	352	16.7	27.9	27.0	31.1	40.0
Tool or cutter	973	1,316	1,661	1,833	1,819	32.0	26.2	34.1	35.2	61.6
Other	778	1,348	1,661	1,650	1,528	72.5	92.3	119.4	108.4	89.8
Gear cutting machines	746	1,001	1,080	1,172	1,129	88.5	129.7	157.1	171.5	194.5
Gear hobbing	349	542	493	541	510	38.4	58.7	67.7	77.8	88.3
Other gear cutting	119	141	180	189	184	18.5	25.3	32.9	36.6	45.2
Gear finishing	278	318	407	442	435	31.6	45.6	56.5	57.2	60.1

(continued)

JAPAN

Exports by Destination

(millions of U.S. dollars)

	1987	1988	1989	1990	1991
METAL CUTTING TOTAL	\$2,049.0	\$2,508.7	\$3,106.6	\$3,148.0	\$3,057.7
United States	673.6	842.4	1,130.2	907.9	843.3
South Korea	268.4	297.0	307.0	424.8	497.4
Germany	193.0	254.1	309.1	352.6	334.8
Thailand	30.4	63.7	141.4	133.4	196.0
Taiwan	99.6	128.1	166.4	125.3	129.9
Belgium	120.5	108.0	161.4	225.6	110.6
United Kingdom	70.7	106.9	145.5	124.4	106.2
Singapore	42.5	68.4	66.6	80.0	100.2
Indonesia	39.8	25.3	38.5	65.8	67.6
Mexico	4.4	17.2	22.2	22.7	67.6
Malaysia	14.8	16.3	27.5	51.8	63.1
France	28.6	69.2	52.5	65.3	57.2
Italy	29.4	47.4	61.6	76.7	47.5
USSR	29.9	52.5	12.0	18.3	46.0
Switzerland	35.3	47.4	57.8	76.1	38.6
Hong Kong	29.6	36.8	32.2	28.2	33.4
Canada	40.2	43.5	47.2	38.5	33.4
China	62.6	27.8	35.3	37.1	32.7
Spain	17.1	26.9	25.7	29.4	26.0
Israel	12.4	13.6	6.6	8.1	25.2
Sweden	33.6	42.1	49.0	52.6	24.5
Netherlands	12.2	16.7	19.1	28.6	24.5
Australia	33.8	46.0	46.1	37.7	20.8
India	27.3	19.5	17.6	16.9	20.8
Brazil	13.8	13.8	15.7	8.5	12.6
Denmark	11.5	10.4	16.0	18.5	11.9
Philippines	4.1	4.5	11.8	10.1	8.9
Other Countries	69.9	63.2	84.6	83.2	77.0
METAL FORMING TOTAL	985.8	919.3	822.2	831.7	917.7
United States	422.2	303.9	253.9	176.2	172.4
South Korea	81.4	90.6	104.9	124.4	115.1
United Kingdom	43.4	27.2	37.8	38.1	89.9
Thailand	14.0	51.3	62.4	69.6	73.0
Canada	28.5	61.2	22.4	35.6	56.4
Taiwan	55.8	80.5	52.8	67.1	56.1
Malaysia	14.5	16.3	20.5	61.0	44.0
Indonesia	11.5	7.4	11.2	16.6	37.0
Singapore	30.0	27.7	26.3	28.8	31.3
China	83.8	52.3	37.6	29.3	27.0
Germany	18.8	20.2	12.8	25.1	25.0
Mexico	4.8	1.0	3.8	21.4	22.4
USSR	57.4	69.6	50.4	22.4	18.3
France	8.8	18.7	26.4	20.4	11.4
Italy	8.8	10.1	14.4	17.1	9.9
India	6.9	9.5	6.1	7.4	8.1
Other Countries	94.4	71.7	78.5	71.2	120.2

Source: Japan Ministry of Finance

JAPAN

Production
(continued)

(millions of U.S. dollars)

	UNITS					VALUE				
	1987	1988	1989	1990	1991	1987	1988	1989	1990	1991
Other metal cutting	48,590	65,800	56,751	71,801	65,167	\$ 243.7	\$ 403.6	\$ 480.7	\$ 552.1	\$ 615.4
NC	793	1,376	2,216	2,530	2,333	71.4	145.1	249.0	290.6	313.3
Non-NC	47,797	64,424	54,535	69,271	62,834	172.3	258.5	231.7	261.4	302.1
Plane, shape, slot	250	227	291	276	294	14.2	17.4	22.7	24.0	25.2
Sawing or cut-off	5,362	6,116	7,113	7,446	7,530	39.5	64.8	74.6	75.7	94.3
Thread or tap	41,062	56,564	46,000	60,246	53,315	42.1	69.4	65.7	71.9	78.7
Other	1,123	1,517	1,131	1,303	1,695	76.5	106.9	68.7	89.8	103.9
METAL FORMING TOTAL	22,101	29,662	31,713	33,545	29,896	1,620.6	1,793.6	1,801.3	1,944.1	2,237.3
Bending machines	866	959	1,010	815	695	48.1	54.4	65.2	58.7	58.4
Presses	15,395	20,449	21,573	22,571	19,201	1,353.8	1,396.4	1,350.5	1,471.8	1,694.6
Hydraulic	5,685	7,212	7,902	7,782	6,731	187.4	264.4	298.5	313.2	319.2
(of which NC	na	1,424	1,928	1,737	1,350	na	39.4	84.2	77.2	95.9)
< 100 tons	4,656	5,828	6,395	5,871	5,211	69.0	104.4	113.9	104.4	84.9
100-500 tons	958	1,299	1,414	1,799	1,409	71.4	108.3	129.8	142.3	133.7
> 500 tons	71	85	93	112	111	47.0	51.7	54.7	66.5	100.4
Mechanical	9,710	13,237	13,672	14,789	12,470	1,166.3	1,132.0	1,052.0	1,158.5	1,375.4
(of which NC	na	1,589	1,928	1,573	1,302	na	270.0	285.2	271.1	334.2)
(Punching	na	1,507	1,843	1,490	1,170	na	125.2	165.2	154.4	132.4)
(Other	na	82	85	83	132	na	144.8	120.0	116.7	201.8)
<100 tons	7,172	10,365	10,736	11,270	9,154	231.4	362.7	335.8	370.3	381.5
100-500 tons	2,246	2,662	2,725	3,341	3,086	239.1	288.8	329.6	359.7	346.9
> 500 tons	292	210	211	178	230	695.8	480.5	386.6	428.6	647.1
Punching or shearing	4,344	5,829	6,611	7,467	7,921	105.6	153.7	178.2	193.9	229.6
Forging or stamping	606	748	774	689	581	56.1	77.8	76.1	79.7	97.8
Wire forming machines	890	1,677	1,745	2,003	1,498	57.1	111.2	131.3	140.0	156.9

Sources: Japan Machine Tool Builders' Association (JMTBA) and Japan Forming Machinery Association (JFMA)

Note: na = not available

JAPAN

Exports by Type of Machine

(millions of U.S. dollars)

	UNITS					VALUE				
	1987	1988	1989	1990	1991	1987	1988	1989	1990	1991
MACHINE TOOL TOTAL	407,817	397,648	390,176	421,698	445,521	\$3,034.8	\$3,428.0	\$3,929.7	\$3,979.8	\$3,975.4
METAL CUTTING TOTAL	373,969	371,411	360,057	421,698	420,812	2,049.0	2,508.7	3,106.6	3,148.0	3,057.7
of which NC	13,404	19,239	21,845	20,145	16,333	1,420.5	1,998.7	2,524.3	2,569.3	2,406.7
Physico-chemical	2,118	6,006	6,718	7,748	7,419	171.4	275.9	306.5	335.9	375.2
Laser	na	140	232	386	366	na	26.8	50.0	76.3	78.0
Ultrasonic	na	759	803	759	712	na	3.1	2.3	12.9	1.9
EDM	na	2,743	2,923	2,856	2,594	na	231.9	237.4	217.8	210.5
NC wire	na	2,124	2,163	2,086	1,572	na	184.2	189.3	173.9	145.8
NC die sinking	na	400	555	397	444	na	37.5	43.3	38.6	52.9
Other EDM	na	219	205	373	578	na	10.2	4.8	5.4	11.8
Other	na	2,364	2,760	3,747	3,747	na	14.1	16.7	28.9	84.8
Machining centers	4,173	4,351	5,253	4,920	4,067	570.9	647.2	812.3	811.4	715.2
Vertical	na	2,742	3,416	3,413	2,745	na	290.0	392.7	415.2	342.6
Horizontal	na	1,258	1,434	1,468	1,290	na	294.9	345.6	383.9	353.5
Other	na	351	403	39	32	na	62.3	74.0	12.3	19.1
Unit construction	(b)	31	19	31	51	(b)	8.0	2.3	9.5	17.4
of which NC	(b)	7	na	22	45	(b)	1.4	na	6.2	16.2
Multi-station transfer	(b)	68	174	132	129	(b)	51.9	133.1	129.3	191.8
of which NC	(b)	21	na	86	91	(b)	32.2	na	99.5	171.5
Lathes	10,149	11,889	13,148	12,786	10,092	627.3	781.7	940.8	948.6	761.3
NC lathes	7,047	8,186	9,266	8,674	6,459	587.1	730.3	870.3	895.9	701.3
Horizontal	na	7,891	9,008	8,281	6,166	na	683.6	834.9	825.9	648.8
Other	na	295	258	393	293	na	46.7	35.4	70.0	52.5
Non-NC lathes	3,102	3,703	3,882	4,112	3,633	40.3	51.3	70.5	52.7	60.0
Center or engine	597	1,475	1,358	1,504	1,186	7.1	11.0	14.0	9.9	15.2
Automatic	1,339	1,014	1,445	1,183	1,056	22.5	27.8	43.4	33.0	29.3
Other horizontal	na	716	657	1,105	1,111	na	5.0	2.5	2.8	2.8
Other	na	498	422	320	280	na	7.6	10.7	7.0	12.7
Way type unit heads	(b)	82	103	42	60	(b)	0.1	2.6	0.3	1.7
of which NC	(b)	-	9	3	6	(b)	-	2.5	0.1	1.5

(continued)

JAPAN

Exports by Type of Machine
(continued)

(millions of U.S. dollars)

	UNITS					VALUE				
	1987	1988	1989	1990	1991	1987	1988	1989	1990	1991
Drilling machines	7,720	7,334	7,030	7,002	7,619	\$ 93.9	\$ 94.2	\$126.3	\$126.4	\$157.4
NC	1,117	1,189	1,566	1,474	1,476	60.0	65.2	94.1	95.8	122.8
Non-NC	6,603	6,145	5,464	5,528	6,143	33.9	29.1	32.2	30.6	34.6
Multi-spindle	251	801	307	251	243	14.2	19.1	15.6	15.1	16.5
Radial	66	121	110	174	113	1.8	2.1	1.8	2.6	2.6
Other	6,286	5,223	5,047	5,103	5,787	17.9	7.9	14.7	12.9	15.5
Boring-milling	na	176	222	144	123	na	35.5	41.1	22.6	38.5
of which NC	na	77	107	58	63	na	27.2	32.7	18.2	35.5
Boring machines	478	339	307	277	318	68.2	34.3	33.0	51.2	50.2
of which NC	129	48	73	69	70	42.4	17.8	19.0	30.1	29.9
Milling machines	3,102	2,306	1,719	1,172	1,254	124.0	91.6	99.1	90.0	108.8
NC	474	328	279	275	268	90.6	59.7	67.7	61.1	63.4
Knee type	na	61	42	33	42	na	5.8	3.8	2.6	4.7
Other	na	267	237	242	226	na	53.9	63.8	58.4	58.7
Non-NC	2,628	1,978	1,440	897	986	33.4	31.9	31.4	28.9	45.4
Profile	262	50	115	53	51	3.0	1.9	1.4	1.7	4.5
Knee type	368	380	336	331	268	9.0	9.1	6.2	6.7	5.6
Other	1,998	1,548	989	513	667	21.3	20.9	23.8	20.5	35.3
Threading or tapping	7,466	8,445	10,466	15,322	12,699	15.9	26.2	39.3	48.9	51.6
of which NC	na	257	443	484	366	na	11.8	21.8	28.2	24.6
Grinding machines	15,636	13,017	13,857	12,789	13,852	234.3	310.3	398.7	390.3	391.6
NC	464	805	890	948	829	69.5	124.3	188.7	191.2	200.8
Surface	na	87	111	108	99	na	14.4	18.4	20.0	15.5
Other grinding	na	368	599	637	518	na	70.5	142.8	133.6	143.8
Tool or cutter	na	48	28	46	77	na	4.7	2.7	5.4	11.6
Honing or lapping	na	187	64	56	82	na	12.5	9.6	7.5	9.2
Other finishing	na	115	88	101	53	na	22.3	15.3	24.8	20.7
Non-NC	15,172	12,212	12,967	11,841	13,023	164.9	186.0	210.0	199.1	190.8
Surface	962	711	670	714	542	23.3	21.5	23.4	30.7	27.6
External cylind.	232	207	187	191	202	19.6	23.4	15.4	17.2	21.1
Internal cylind.	92	101	115	104	66	7.7	11.0	15.0	11.1	8.2
Centerless	183	182	212	200	188	18.9	20.2	30.1	26.4	26.7

(continued)

JAPAN

Exports by Type of Machine
(continued)

(millions of U.S. dollars)

	UNITS					VALUE				
	1987	1988	1989	1990	1991	1987	1988	1989	1990	1991
Other grinding	na	416	347	578	246	na	\$ 30.4	\$ 21.0	\$ 23.6	\$ 17.3
Tool or cutter	141	4,099	4,864	4,197	6,151	2.3	12.1	15.3	15.8	16.3
Honing or lapping	na	298	410	370	364	na	13.6	26.2	18.3	21.3
Other finishing	na	6,198	6,162	5,487	5,264	na	53.6	63.6	56.1	52.3
Planing machines	35	58	51	53	58	1.1	4.7	7.9	5.4	3.1
of which NC	na	3	6	7	1	na	2.3	4.5	4.3	1.4
Gear cutting machines	436	474	474	504	331	44.0	36.8	33.9	49.1	45.1
NC	na	161	130	185	157	na	26.4	23.7	35.1	37.2
Non-NC	na	313	344	319	174	na	10.4	10.2	14.0	7.9
Gear hobbing	219	182	211	199	101	18.1	5.4	5.3	9.4	3.8
Other gear cutting	na	79	75	63	36	na	3.3	1.8	2.2	1.3
Gear finishing	na	52	58	57	37	na	1.7	3.1	2.4	2.8
Sawing or cut-off	321,460	313,263	297,641	357,244	361,122	64.4	89.1	100.9	111.8	116.0
Shaping or slotting	(b)	1,401	270	294	327	(b)	4.1	3.1	3.9	5.9
Broaching machines	(b)	38	66	60	54	(b)	4.4	9.2	9.3	8.6
Other metal cutting	1,196	2,133	2,539	1,178	1,237	33.6	12.7	16.5	13.2	18.8
METAL FORMING TOTAL	33,848	26,237	30,119	31,378	24,709	985.8	919.3	822.2	831.7	917.7
Forging or stamping	299	510	720	512	471	35.7	55.2	54.4	49.0	74.1
Bending or forming	2,030	2,491	2,821	3,057	3,393	65.7	72.2	88.7	83.0	102.8
of which NC	na	248	301	256	269	na	25.9	31.7	30.0	36.6
Punching or shearing	8,556	8,460	9,220	10,874	7,472	110.6	195.5	174.8	199.3	163.1
Shearing	na	6,200	7,254	8,692	5,342	na	40.5	37.5	46.8	51.9
of which NC	na	67	35	68	119	na	10.6	5.1	15.0	14.1
Punching or notching	na	2,260	1,966	2,182	2,130	na	155.0	137.3	152.5	111.2
of which NC	na	866	1,089	1,068	639	na	101.3	113.2	127.7	80.5
Presses	6,673	10,084	11,912	11,648	8,731	656.1	500.0	409.6	382.9	470.0
of which hydraulic	1,633	2,066	2,340	2,381	2,248	78.1	78.7	82.6	90.7	109.2
Draw benches	209	457	331	507	339	9.2	23.0	19.0	26.0	16.6
Thread rolling machines	(c)	567	376	280	272	(c)	6.9	8.0	6.7	6.3
Wire working machines	(c)	803	682	906	800	(c)	27.9	28.2	32.6	34.3
Other metal forming	16,081	2,865	4,057	3,594	3,231	108.5	38.6	39.6	52.2	50.6

Source: Japan Ministry of Finance

Note: b = included in "other metal cutting"; c = included in "other metal forming"; na = not available

JAPAN

Imports by Type of Machine

(millions of U.S. dollars)

	UNITS					VALUE				
	1987	1988	1989	1990	1991	1987	1988	1989	1990	1991
MACHINE TOOL TOTAL	47,564	96,806	115,475	100,937	107,863	\$264.3	\$397.1	\$508.5	\$652.0	\$633.9
METAL CUTTING TOTAL	42,429	92,592	110,364	96,209	101,528	152.6	286.6	366.0	473.8	434.3
of which NC	551	855	882	1,152	1,142	70.7	112.6	139.6	202.9	187.1
Physico-chemical	190	1,168	1,443	1,530	1,457	9.1	96.5	124.2	121.8	105.9
Laser, light, photon	na	155	172	250	156	na	17.3	25.8	32.6	23.4
Ultrasonic	na	29	61	61	77	na	0.4	0.5	0.8	0.9
EDM	na	503	457	379	466	na	18.2	22.3	17.2	20.2
NC wire	na	60	54	103	255	na	8.4	7.0	9.6	14.2
NC die sinking	na	109	77	42	35	na	6.4	8.6	4.0	3.8
Other EDM	na	334	326	234	176	na	3.4	6.7	3.6	2.2
Other	na	481	753	840	758	na	60.7	75.5	71.2	61.4
Machining centers	(b)	80	103	164	125	(b)	5.2	10.4	12.8	10.5
Horizontal	(b)	19	34	40	72	(b)	1.3	2.8	4.1	6.8
Other	(b)	61	69	124	53	(b)	3.9	7.6	8.7	3.7
Unit construction	(b)	2	2	1	104	(b)	0.8	0.6	0.4	2.8
Multi-station transfer	(b)	10	15	33	55	(b)	3.5	3.2	16.2	14.1
Lathes	1,419	1,873	3,113	2,665	2,392	17.1	26.9	33.5	38.5	40.8
NC lathes	49	141	74	83	96	6.5	12.0	6.9	8.5	9.4
Horizontal	na	107	58	67	86	na	6.3	4.8	6.9	8.3
Other	na	34	16	16	10	na	5.7	2.1	1.6	1.1
Non-NC lathes	1,370	1,732	3,039	2,582	2,296	10.6	14.8	26.6	30.0	31.4
Center or engine	1,094	1,258	2,203	2,011	1,886	6.3	9.2	17.1	17.5	18.4
Automatic	87	174	181	129	141	2.6	4.2	6.5	7.7	9.7
Copying	-	1	95	28	19	-	(a)	0.6	0.2	0.5
Other horizontal	na	202	283	309	158	na	0.4	0.7	0.6	0.6
Other non-NC	na	97	277	105	92	na	1.1	1.8	4.0	2.2
Drilling machines	14,753	24,543	32,865	24,865	36,841	6.4	5.1	9.1	13.2	18.2
of which NC	136	10	87	81	58	2.8	1.7	2.6	2.7	5.0
(continued)										

JAPAN

Imports by Type of Machine
(continued)

(millions of U.S. dollars)

	UNITS					VALUE				
	1987	1988	1989	1990	1991	1987	1988	1989	1990	1991
Boring machines	38	34	24	49	33	\$ 3.0	\$ 4.7	\$ 2.0	\$ 6.2	\$ 5.4
of which NC	3	7	3	5	9	1.1	2.5	0.5	2.3	3.9
Boring-milling machines	na	43	117	90	62	na	5.2	6.0	5.3	3.5
of which NC	na	16	31	14	7	na	3.3	3.0	2.9	1.7
Milling machines	1,325	1,308	1,552	1,639	1,164	14.6	6.3	9.8	13.8	8.8
NC	49	76	56	54	23	10.1	2.0	3.1	5.7	4.4
Knee type	na	39	27	24	10	na	0.6	0.3	0.2	0.1
Non-NC	1,276	1,232	1,496	1,585	1,141	4.5	4.4	6.7	8.1	4.4
Univ. or profile	800	236	105	13	9	1.4	0.8	0.4	0.1	0.1
Knee type	142	151	412	352	226	1.2	1.1	3.4	2.3	1.2
Other	334	845	979	1,220	906	1.9	2.5	2.9	5.7	3.1
Threading or tapping	17	66	145	177	405	(a)	0.5	1.3	1.1	0.9
Grinding machines	20,709	60,125	62,288	48,413	50,633	71.3	80.0	98.6	142.6	120.8
NC	113	156	178	283	305	29.5	33.2	45.4	72.9	60.7
Surface	na	26	36	107	160	na	2.7	4.8	13.0	20.8
Other grinding	na	61	80	96	68	na	22.1	27.6	42.4	27.2
Tool or cutter	na	24	28	43	52	na	6.0	5.9	10.1	7.3
Other finishing	na	45	34	37	25	na	2.4	7.1	7.3	5.4
Non-NC	20,596	59,969	62,110	48,130	50,328	41.7	46.9	53.2	69.7	60.1
Surface	946	830	911	939	735	12.7	10.6	14.6	17.6	12.7
External cylind.	60	66	93	115	88	7.2	7.7	8.1	11.2	8.9
Internal cylind.	23	19	31	13	18	1.7	1.4	2.9	2.2	2.3
Thread grinding	20	9	9	8	9	0.6	1.1	0.6	1.8	0.6
Tool or cutter	na	17,421	20,607	28,374	34,845	na	5.7	7.7	11.9	13.0
Honing or lapping	na	514	115	64	183	na	4.5	3.8	7.7	7.1
Other finishing	na	27,044	14,703	1,268	2,891	na	4.0	3.0	2.9	4.5
Other	na	14,066	25,641	17,349	11,559	na	11.9	12.4	14.3	11.0
Planing machines	4	5	1	9	18	0.5	0.4	0.1	1.2	0.4
(continued)										

JAPAN

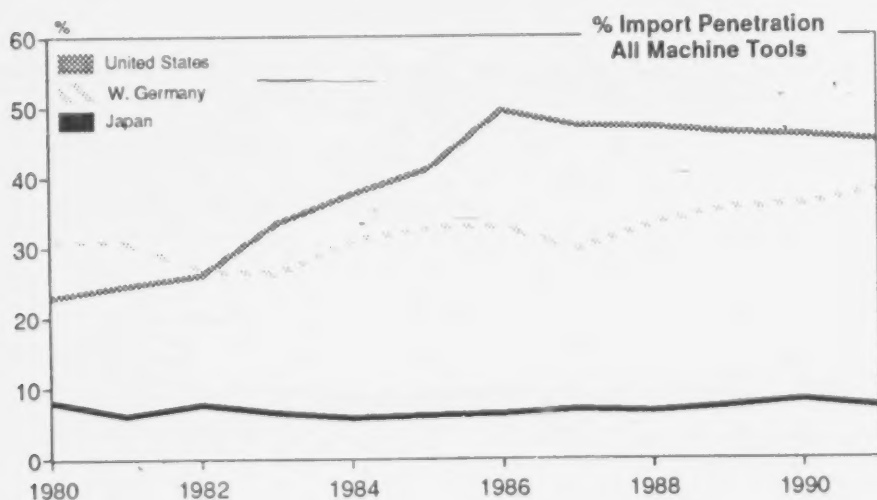
Imports by Country of Origin

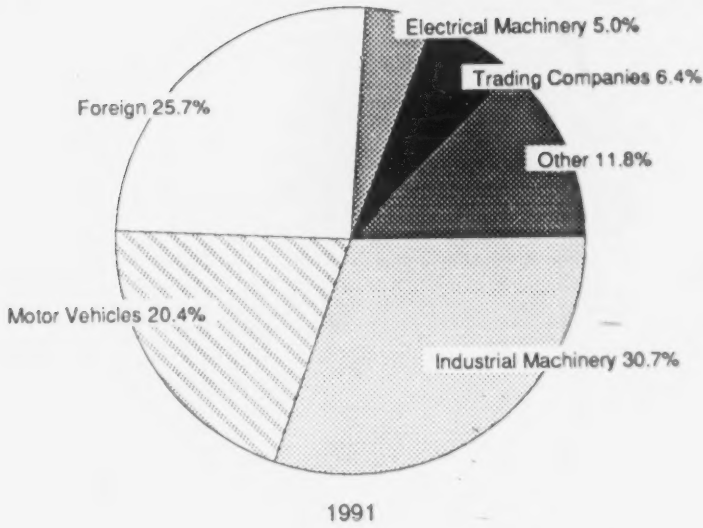
(millions of U.S. dollars)

	1987	1988	1989	1990	1991
METAL CUTTING TOTAL	\$152.6	\$286.6	\$366.0	\$474.1	\$434.3
United States	29.3	106.2	141.2	143.5	132.6
Germany	42.7	56.3	65.9	121.7	108.4
Switzerland	36.3	58.3	64.4	93.1	75.1
Taiwan	10.3	18.1	35.6	37.0	39.2
South Korea	3.4	7.7	12.0	13.7	14.5
Singapore	7.5	9.3	11.8	17.0	14.4
United Kingdom	2.9	4.9	5.0	10.9	6.6
Italy	3.2	4.2	3.7	3.8	6.4
China	1.2	1.9	4.2	4.2	5.5
USSR	4.4	5.2	2.6	4.4	2.2
France	0.7	3.2	2.4	2.7	2.1
East Germany	2.9	4.2	5.3	5.2	(b)
Other Countries	7.8	7.1	11.9	16.8	27.2
METAL FORMING TOTAL	111.7	110.5	142.5	178.2	199.6
Germany	33.2	20.5	43.5	62.5	54.8
United States	32.8	47.7	43.7	38.4	65.6
Switzerland	11.4	20.5	18.9	29.0	29.4
Italy	6.5	7.9	16.3	22.0	18.5
USSR	1.8	1.6	1.7	3.1	7.2
Taiwan	0.7	1.6	4.0	3.5	5.1
Sweden	0.3	1.7	3.1	1.7	2.0
South Korea	0.6	1.5	1.1	1.8	1.4
United Kingdom	2.1	2.5	4.0	4.7	1.2
France	1.3	0.7	0.1	0.6	0.4
Other Countries	21.2	4.2	6.1	10.9	14.0

Source: Japan Ministry of Finance

Note: b = included in "Germany"





(millions of U.S. dollars)

User Industry	1987	1988	1989	1990	1991
TOTAL ORDERS	\$4,809.8	\$7,749.5	\$9,203.3	\$9,752.7	\$8,471.5
of which NC	3,698.8	6,078.4	7,560.7	8,106.9	7,011.4
Primary metals	49.8	59.3	81.4	100.1	88.3
Fabricated metal products	141.4	160.2	232.0	245.2	170.0
Industrial machinery	1,232.5	2,375.6	2,889.5	3,007.8	2,601.1
Electrical machinery	178.4	316.6	366.6	422.7	422.4
Motor vehicles	888.4	1,391.9	1,873.7	2,060.2	1,729.6
Ships/transportation equip.	53.0	113.7	129.6	115.3	135.8
Precision instruments	203.1	306.0	272.8	250.7	207.1
Other machinery or equipment	102.9	216.5	281.9	300.4	292.5
Government, schools, etc.	22.9	39.1	26.5	25.6	26.0
Other domestic end users	20.5	56.3	93.6	89.1	84.6
Trading companies	394.4	518.3	507.6	556.7	541.2
Foreign orders	1,522.7	2,196.0	2,448.0	2,578.2	2,175.0
BACKLOG	1,974.0	3,154.8	3,803.2	4,231.6	3,633.0
of which NC	1,328.3	2,183.2	2,859.2	3,114.2	2,716.2

Source: Japan Machine Tool Builders' Association (JMTBA)

MALAYSIA

Imports by Type of Machine

(millions of U.S. dollars)

	UNITS				VALUE			
	1987	1988	1989	1990	1987	1988	1989	1990
MACHINE TOOL TOTAL	13,362	26,660	123,789	na	\$53.6	\$73.2	\$147.4	\$299.0
METAL CUTTING TOTAL	na	15,741	101,954	na	na	36.2	77.9	150.8
Physico-chemical	45	296	1,010	na	0.3	2.2	5.2	16.5
Laser or photon	na	1	7	na	na	(a)	0.2	0.6
Ultrasonic	na	29	58	na	na	0.1	0.2	1.5
EDM	na	66	127	na	na	1.0	1.6	5.2
Other	na	200	818	na	na	1.1	3.2	9.2
Machining centers	(c)	7	36	na	(c)	0.6	2.5	5.5
Transfer machines	(c)	5	23	na	(c)	(a)	0.3	4.2
Lathes	529	743	2,463	na	5.1	8.0	17.4	31.9
NC horizontal	na	56	89	na	na	0.6	1.3	3.8
Other NC	na	28	40	na	na	1.4	1.4	1.9
Non-NC horizontal	na	5	651	na	na	(a)	4.0	5.7
Other non-NC	na	654	1,683	na	na	6.0	10.6	20.4
Way type unit heads	(c)	9	117	na	(c)	(a)	0.3	1.6
Drilling machines	1,358	3,855	6,563	na	1.8	2.0	3.8	7.0
of which NC	na	25	27	na	na	0.4	0.3	0.7
Boring-milling	(c)	37	41	na	(c)	0.4	1.2	2.4
of which NC	(c)	1	6	na	(c)	0.1	0.1	0.7
Boring machines	(c)	91	131	na	(c)	1.0	1.1	1.5
Milling machines	327	1,065	1,463	na	2.4	3.8	8.0	12.2
NC knee type	na	29	63	na	na	0.1	0.4	0.8
Non-NC knee type	na	52	484	na	na	0.5	2.8	2.2
Other NC	na	16	21	na	na	0.3	0.2	0.9
Other non-NC	na	968	895	na	na	2.9	4.6	8.3
Threading or tapping	247	381	2,826	na	0.6	1.2	5.1	5.2
Grinding machines	2,309	2,471	5,153	na	11.6	9.1	13.1	23.7
NC surface	na	26	24	na	na	1.0	0.6	1.9
Non-NC surface	na	412	555	na	na	0.9	2.5	2.7
Other NC grinding	na	39	23	na	na	1.7	0.2	2.7
Other non-NC grind.	na	425	2,188	na	na	1.6	3.8	8.0
NC sharpening	na	8	6	na	na	(a)	(a)	0.1
Non-NC sharpening	na	252	451	na	na	0.6	1.7	2.4
Honing or lapping	na	47	145	na	na	0.8	1.2	1.0
Tool or cutter	na	1,262	1,761	na	na	2.4	3.1	4.9
Shaping or slotting	(c)	207	480	na	(c)	0.4	1.4	1.6
Broaching machines	(c)	7	6	na	(c)	(a)	0.1	0.6
Gear cutting machines	73	194	631	na	0.4	0.9	1.1	1.1
Sawing or cutting-off	2,303	2,881	5,599	na	1.3	1.8	6.3	19.4
Planing machines	33	159	28	na	(a)	0.2	0.2	0.6
Other metal cutting	(c)	2,590	72,921	na	0	4.7	11.1	15.7
METAL FORMING TOTAL	na	10,919	21,835	na	na	37.0	69.5	148.2
Forging, die-stamping	142	790	598	na	0.8	2.0	5.1	14.5
Bending or forming	1,734	2,739	4,871	na	2.9	5.4	9.2	25.3
of which NC	na	2	47	na	na	(a)	0.5	7.1
Shearing machines	na	361	1,770	na	na	2.2	4.3	10.5
of which NC	na	19	23	na	na	0.1	1.8	2.7
Punching or notching	na	918	4,245	na	na	5.1	7.5	19.0
of which NC	na	10	31	na	na	0.6	1.7	1.5
Presses	810	4,795	6,455	na	8.0	13.9	29.6	49.9
of which hydraulic	na	272	601	na	na	2.1	9.4	15.7
Draw benches	(c)	88	26	na	(c)	0.3	0.8	1.4
Thread rolling machines	(c)	18	104	na	(c)	0.1	0.3	1.4
Wire working machines	(c)	145	2,001	na	(c)	4.4	5.7	12.4
Other metal forming	3,063	1,065	1,765	na	15.4	3.6	6.9	13.8
Parts or accessories	na	na	na	na	na	13.5	24.1	31.6

Source: Jabatan Perangkaan, Department of Statistics

Note: a = less than \$50,000; c = included in "other metal forming"; na = not available

SINGAPORE

Industry Overview

(millions of U.S. dollars)

	Production	Imports	Total Exports	Consumption	Domestic Exports	Re-Exports
1987	\$35.5	\$141.0	\$78.4	\$134.3	\$42.2	\$36.1
1988	41.8	213.4	118.7	189.5	65.7	53.0
1989	53.0	229.8	130.4	229.8	52.9	77.4
1990	104.6	266.4	122.9	305.9	65.1	57.8
1991E	113.0	298.8	154.0	355.1	56.7	97.4

Sources: American Machinist, Singapore Trade Development Board

Note: E = estimate; "Domestic exports" = exports of Singapore-made machines; "Re-exports" = non-Singapore made machines transshipped via Singapore; "Total exports" = "Domestic exports" plus "Re-exports"; "Consumption" equals "Total production" plus "Total imports" minus "Domestic exports"

SINGAPORE

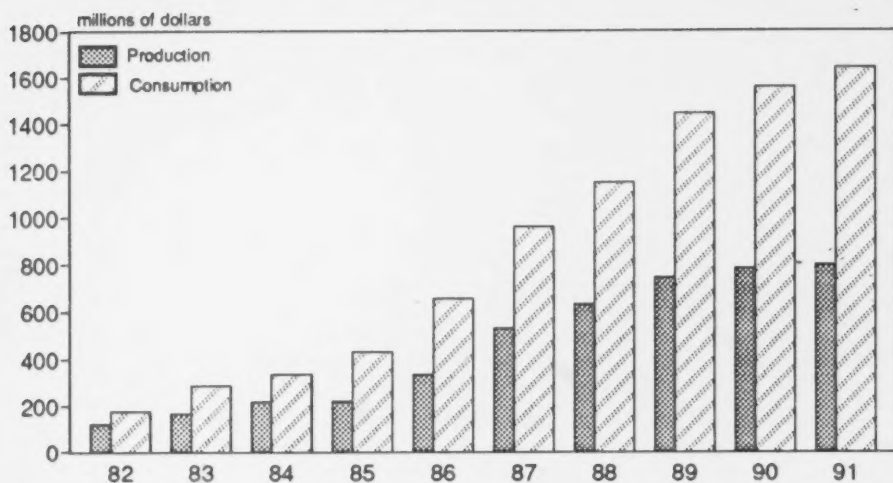
Imports by Type of Machine

(millions of U.S. dollars)

	UNITS				VALUE			
	1987	1988	1989	1990	1987	1988	1989	1990
MACHINE TOOL TOTAL	16,325	21,263	33,619	74,531	\$141.0	\$213.4	\$229.8	\$266.4
Physico-chemical	68	80	316	604	1.3	1.5	7.5	16.8
Lathes	1,132	1,942	2,292	3,397	17.7	30.3	37.9	42.5
Reaming or milling	880	1,028	2,028	2,553	10.2	15.4	23.3	26.0
Boring or drilling	1,968	2,620	1,378	2,826	9.7	14.7	9.4	14.1
Gear cutting machines	106	104	577	1,111	0.8	1.6	2.7	2.9
Thread or tap	462	654	1,263	1,247	2.5	5.0	3.9	4.6
Sawing machines	963	919	2,183	7,385	2.9	4.3	10.0	10.8
Planing machines	11	15	9	17	(a)	0.2	0.1	0.1
Grinding machines	2,170	2,949	4,292	19,916	23.4	36.5	28.9	26.4
Forging or stamping	255	209	472	2,523	3.1	3.5	5.8	7.4
Bending or forming	1,097	752	1,024	2,815	8.0	7.0	7.2	8.1
Punching or shearing	1,263	2,258	2,274	1,664	9.1	10.5	11.2	12.1
Presses	2,027	3,251	4,611	6,349	25.9	39.7	30.4	31.8
Mach. to make boxes, cans, etc. from tinplate	74	148	203	165	2.7	5.0	8.2	3.9
Other machine tools	3,923	4,482	10,900	21,959	23.7	38.2	43.3	59.0
Work holders*	-	-	-	-	8.3	14.3	16.3	20.8
Other parts & accessories**	-	-	-	-	36.5	56.1	53.7	63.4

Sources: American Machinist, Singapore Trade Development Board

Note: a = less than \$50,000; * = work holders, tool holders, self-opening dies and dividing heads for machine tools, ** = other parts and accessories for metalworking equipment



(millions of U.S. dollars)

	Production	Exports	Imports	Consumption	% Import Penetration	Exports as % of Prod.
1982	\$124.8	\$34.9	\$86.7	\$176.6	49.1%	28.0%
1983	167.9	21.4	139.8	286.3	48.8	12.7
1984	219.9	21.6	135.0	333.3	40.5	9.8
1985	220.7	23.4	228.6	425.9	53.7	10.6
1986	334.3	27.7	358.0	628.3	53.9	8.3
1987	530.9	37.5	486.1	979.5	49.6	7.1
1988	632.4	57.0	609.3	1,184.7	51.4	9.0
1989	744.2	80.5	777.3	1,441.0	53.9	10.8
1990	785.1	86.9	851.1	1,549.3	54.9	11.1
1991	798.4	95.4	940.9	1,643.9	57.2	11.9

Source: Korea Machine Tool Manufacturers' Association (KOMMA)

SOUTH KOREA

Exports by Type of Machine

(millions of U.S. dollars)

	UNITS			VALUE		
	1989	1990	1991	1989	1990	1991
MACHINE TOOL TOTAL	34,366	29,371	27,957	\$80,453	\$86,913	\$95,351
METAL CUTTING TOTAL	15,392	18,789	18,151	71,405	67,475	66,250
Physico-chemical machines	66	56	159	1,397	706	1,286
Laser, light, photon	26	20	28	844	37	476
Ultrasonic	10	7	78	196	41	112
EDM	9	24	7	185	556	213
Other	21	5	46	172	72	485
Machining centers	189	222	148	9,437	13,249	9,720
Unit construction	1	10	2	80	234	35
Multi-station transfer	1	6	4	51	30	77
Lathes	2,697	1,438	1,260	43,959	34,555	32,561
NC horizontal	381	174	150	11,117	10,337	8,150
Non-NC horizontal	556	539	397	5,087	5,299	4,253
Other NC	495	632	665	26,551	18,050	19,487
Other non-NC	1,265	93	48	1,204	869	671
Way type unit heads	5	62	na	43	233	na
Drilling machines	365	243	249	1,736	2,891	3,604
of which NC	85	19	65	636	1,256	1,268
Boring-milling machines	6	2	3	37	246	33
of which NC	4	2	-	11	246	-
Boring machines	-	35	2	-	84	243
Milling machines	362	315	759	4,230	3,800	7,794
NC knee type	-	1	-	-	17	-
Non-NC knee type	303	192	382	2,880	1,453	1,453
Other NC	1	5	3	57	34	16
Other non-NC	58	117	374	1,293	2,296	6,325
Threading or tapping	1,124	1,806	376	332	225	274
Grinding machines	5,425	8,824	7,309	8,078	7,701	8,373
NC surface	1	1	5	9	69	70
Non-NC surface	194	29	55	875	205	696
Other NC grinding	3	-	56	96	-	1,109
Other non-NC grinding	2,523	1,452	1,323	2,046	1,380	1,226
Tool or cutter	5	3	7	105	24	40
Honing or lapping	18	9	2	26	25	153
Other	2,681	7,330	5,861	4,921	5,998	5,080
Planing machines	1	1	8	1	12	35
Shaping or slotting	2	36	63	32	54	45
Broaching machines	-	na	4	-	3	45
Gear cutting machines	21	38	4	946	710	375
of which NC	-	-	1	-	-	154
Sawing or cutting-off	5,078	5,544	7,313	876	2,002	1,078
Other metal cutting	49	151	91	170	740	682
METAL FORMING TOTAL	18,974	10,582	9,806	9,078	19,438	29,101
Forging or die-stamping	3,035	313	1,826	376	716	4,214
Bending or forming	685	346	1,223	697	4,090	8,098
of which NC	3	4	9	4	121	1,043
Shearing machines	200	81	991	2,607	4,644	4,593
of which NC	3	12	-	1,011	2,213	-
Punching or notching	4,237	5,237	4,032	188	1,134	1,925
of which NC	-	-	1	-	-	105
Presses	470	1,422	683	2,475	5,671	6,522
of which hydraulic	142	323	147	1,326	1,735	2,716
Drawing machines	504	29	13	617	390	194
Thread-rolling	8,511	2,866	1,514	1,466	664	748
Wire working machines	930	59	51	197	798	2,400
Other metal forming	402	229	473	455	1,331	407

Source: Korea Machine Tool Manufacturers' Association (KOMMA)

Note: na = not available

SOUTH KOREA

Imports by Type of Machine

(millions of U.S. dollars)

	UNITS				VALUE			
	1988	1989	1990	1991	1988	1989	1990	1991
MACHINE TOOL TOTAL	160,756	25,609	19,317	86,621	\$609.3	\$777.3	\$851.1	\$940.9
METAL CUTTING MACHINES	75,268	21,782	15,649	77,684	464.3	543.6	634.6	654.4
Physico-chemical	351	1,442	941	4,966	27.7	41.4	47.5	53.3
Laser, light, photon	26	30	74	401	3.7	5.8	13.8	14.5
Ultrasonic	62	112	87	2,541	0.9	0.5	0.6	0.5
EDM	182	371	337	790	20.2	24.9	31.1	30.7
Others	81	929	443	1,234	2.9	10.3	2.1	7.6
Machining centers	na	165	198	541	13.9	32.2	30.4	50.4
Unit construction	5	10	14	34,511	0.9	3.3	8.8	7.7
Multi-station transfer	60	76	184	306	37.3	71.2	87.6	89.2
Lathes	10,982	3,503	2,805	3,430	60.6	64.3	74.4	68.2
NC horizontal	103	205	487	524	12.8	14.7	26.7	26.7
Other NC lathes	60	58	65	94	11.9	10.7	15.3	11.8
Non-NC horizontal	9,550	1,853	1,513	1,951	18.4	27.0	20.5	19.0
Other non-NC	1,269	1,387	740	861	17.5	11.8	11.8	10.7
Way type unit head	373	18	17	22	4.9	0.4	0.6	0.2
Drilling machines	1,344	2,599	2,456	3,684	13.2	15.3	26.1	34.5
NC drilling	30	101	173	140	3.3	8.4	19.2	27.4
Non-NC drilling	1,314	2,498	2,283	3,544	9.9	6.9	6.9	7.1
Radial	9	90	81	77	0.2	1.4	1.2	0.6
Upright	252	724	854	1,631	0.3	0.1	0.3	0.2
Multi-spindle	21	186	28	52	2.2	1.1	1.5	1.2
Other	1,032	1,498	1,320	1,784	7.2	4.3	3.9	5.1
Boring-milling	96	106	139	372	17.6	17.0	19.8	22.7
of which NC	62	44	117	49	14.5	9.1	17.9	21.2
Boring machines	1,066	143	801	1,783	16.0	24.8	29.1	28.2
Jig boring	14	24	120	37	1.8	3.3	2.3	3.6
Horizontal	35	64	90	34	5.2	9.0	5.3	7.8
Other	1,017	55	591	1,712	9.0	12.5	21.5	16.8
Milling machines	5,885	2,059	1,634	1,430	31.5	48.5	40.5	48.9
NC knee type	13	16	39	34	0.7	1.5	1.4	1.2
Non-NC knee type	4,121	1,041	1,196	890	4.3	6.5	4.6	3.2
Other NC milling	78	58	73	118	13.5	19.3	13.1	24.5
Bed-type	38	31	24	32	1.2	1.5	5.4	4.2
Planing	22	127	76	12	2.3	7.2	1.4	1.7
Universal tool	23	15	22	5	0.6	0.5	0.3	0.6
Profile	6	9	10	7	0.7	0.9	2.3	1.3
Others	1,584	762	194	332	8.2	11.1	11.9	12.2
Surface grinding	525	255	298	2,567	15.4	13.3	22.2	23.4
of which NC	47	25	40	35	4.9	4.3	12.2	10.4
Other grinding machines	1,334	1,822	1,260	1,802	117.2	99.0	101.8	97.6
NC	194	120	320	204	38.9	34.8	37.1	48.9
Cylindrical	136	307	191	351	17.3	23.1	17.9	16.7
Internal	95	73	74	67	12.0	7.4	6.8	3.7

(continued)

F

JAPAN

Imports by Type of Machine
(continued)

(millions of U.S. dollars)

	UNITS					VALUE				
	1987	1988	1989	1990	1991	1987	1988	1989	1990	1991
Gear cutting machines	119	201	199	206	225	\$ 16.5	\$ 33.4	\$ 41.6	\$ 67.5	\$ 72.9
NC	12	45	47	73	73	6.4	20.7	26.1	48.8	50.1
Non-NC	107	156	152	133	152	10.1	12.7	15.4	18.7	22.8
Gear hobbing	52	107	58	46	69	1.2	3.2	2.4	2.7	3.5
Other gear cutting	na	19	38	47	40	na	3.6	5.0	9.3	10.7
Gear finishing	na	30	56	40	43	na	5.8	8.1	6.8	8.6
Sawing or cutting-off	1,525	2,432	7,291	15,256	6,761	2.5	7.3	13.5	17.1	20.8
Shaping or slotting	(b)	15	37	24	273	(b)	0.3	0.1	0.3	2.0
Broaching machines	3	2	1	3	9	0.2	0.6	0.8	(a)	0.1
Other metal cutting	2,275	685	1,168	1,085	971	5.3	10.0	11.1	16.1	6.4
METAL FORMING TOTAL	5,135	4,214	5,111	4,728	6,335	111.7	110.5	142.5	178.2	199.6
Forging or die-stamping	89	74	314	149	151	28.8	16.3	29.3	42.4	63.9
Bending or forming	335	738	1,137	1,274	1,448	16.1	17.2	25.3	24.0	28.7
of which NC	26	24	44	62	65	8.6	6.8	11.7	14.9	16.8
Punching or shearing	303	604	1,086	933	1,185	9.9	22.2	24.8	28.9	22.2
NC shearing	2	4	7	55	19	0.1	0.4	1.2	3.1	1.9
Non-NC shearing	na	429	846	597	858	na	2.3	4.8	10.7	7.5
NC punch or notch	26	38	54	40	36	6.6	8.8	12.6	9.3	8.1
Non-NC punch or notch	na	133	179	241	272	na	10.6	6.2	5.7	4.7
Presses	495	786	1,551	883	2,550	27.6	29.1	25.6	27.4	34.1
of which hydraulic	102	114	190	178	153	6.1	3.5	10.5	10.8	12.0
Draw benches	5	21	51	26	18	0.7	1.5	3.8	7.1	7.0
Thread rolling machines	(c)	24	47	15	26	(c)	1.3	2.3	0.8	2.0
Machines to form springs	26	23	24	38	31	2.6	1.9	2.0	4.5	4.5
Wire working machines	(c)	236	183	251	235	(c)	8.3	6.0	13.8	15.9
Other metal forming	3,882	1,708	718	1,197	691	26.5	12.7	23.6	29.3	21.2

Source: Japan Ministry of Finance

Note: a = less than \$50,000; b = included in "other metal cutting"; c = included in "other metal forming"; na = not available

SOUTH KOREA

(millions of U.S. dollars)

Production

	UNITS					VALUE				
	1987	1988	1989	1990	1991	1987	1988	1989	1990	1991
MACHINE TOOL TOTAL	56,903	132,427	48,744	54,789	64,414	\$530.9	\$632.4	\$744.2	\$785.1	\$798.4
METAL CUTTING TOTAL	52,695	128,412	46,361	52,641	62,457	393.5	482.9	602.9	638.1	659.3
Lathes	8,112	9,111	9,363	10,222	10,387	136.6	174.7	242.8	250.7	269.8
of which NC	1,356	1,453	1,952	2,298	2,527	72.0	84.2	137.9	142.1	158.4
Milling machines	3,372	3,382	3,277	3,853	3,967	54.0	67.1	75.1	91.8	94.9
of which NC	103	107	94	211	188	9.8	11.3	10.5	20.5	19.1
Machining centers	410	477	572	785	804	50.8	62.8	75.0	91.8	93.7
Transfer lines	461	374	379	496	524	66.1	56.9	68.0	65.6	64.4
EDM	467	368	318	369	408	14.5	15.8	17.5	17.1	18.5
of which NC	96	68	90	92	83	6.4	7.4	9.6	8.8	9.2
Boring machines	72	93	93	95	95	6.2	10.0	11.6	11.3	12.1
of which NC	3	2	12	8	13	0.3	0.2	2.2	1.1	2.1
Gear cutting machines	106	114	118	53	90	8.6	8.1	9.9	9.5	10.1
of which NC	3	12	8	11	21	0.4	1.8	2.4	2.8	5.7
Grinding machines	2,256	65,058	1,617	1,624	1,778	25.4	35.4	37.2	37.4	33.3
of which NC	15	7	15	28	35	1.0	0.7	1.3	2.2	2.4
Drilling machines	5,779	6,334	5,618	5,156	5,611	13.5	19.4	24.8	26.8	28.5
of which NC	4	3	14	11	4	0.4	0.3	2.8	3.1	0.6
Planing machines	20	22	26	17	14	1.6	3.0	11.6	6.4	2.9
of which NC	3	-	9	6	-	0.5	-	8.9	4.1	-
Sawing machines	29,402	40,354	22,867	27,923	36,534	8.7	11.4	11.3	13.0	13.9
Tapping machines	1,704	2,204	1,847	1,791	1,948	2.3	3.3	2.6	2.2	2.3
Shaping machines	67	44	78	34	43	0.8	0.3	0.7	0.3	0.4
Other metal cutting	467	477	188	223	254	4.4	14.8	14.6	14.1	14.6
METAL FORMING TOTAL	4,208	4,015	2,383	2,148	1,957	137.4	149.4	141.4	147.0	139.1
Presses	3,591	3,374	1,882	1,916	1,844	119.2	125.1	116.6	126.8	121.6
Rolling machines	na	na	na	na	2	8.2	9.0	9.2	14.3	10.1
Shearing machines	53	17	26	42	31	1.6	0.6	2.0	1.4	2.1
Wire drawing machines	197	202	70	22	5	6.5	13.3	9.6	1.8	1.5
Bending machines	19	20	19	29	21	0.2	0.2	0.1	0.3	0.5
Other metal forming	346	402	386	139	54	1.8	1.2	3.8	2.5	3.4

Source: Korea Machine Tool Manufacturers' Association (KOMMA)

Note: na = not available

SOUTH KOREA

Imports by Type of Machine
(continued)

	(millions of U.S. dollars)							
	UNITS				VALUE			
	1988	1989	1990	1991	1988	1989	1990	1991
Centerless	71	59	44	26	\$10.4	\$6.9	\$7.8	\$4.7
Profile	53	66	57	30	7.1	3.9	10.0	4.6
Others	785	1,197	574	1,123	31.4	22.9	22.2	19.0
Tool or cutter grinding	729	590	571	595	7.8	10.1	10.9	12.8
of which NC	10	28	24	46	2.1	5.2	4.5	8.8
Honing or lapping	7,063	715	1,384	2,623	31.5	23.4	29.6	30.0
Honing machines	3,255	62	na	48	10.6	8.8	8.4	7.4
Lapping machines	307	120	na	319	7.5	4.4	7.9	8.7
Others	3,501	532	na	2,256	13.4	10.0	13.3	13.9
Shaping or slotting	35	59	83	44	1.4	2.5	2.5	2.6
Broaching machines	177	40	19	17	4.3	5.2	3.3	3.2
Threading or tapping	408	453	424	5,800	4.8	3.1	3.0	3.4
Tapping	326	321	na	305	4.3	2.1	na	2.6
Other threading	82	132	na	5,495	0.5	1.0	na	0.8
Planing machines	18	28	28	3,511	5.3	14.7	15.4	0.4
of which NC	2	4	3	-	0.1	2.1	1.0	-
Gear cutting machines	280	331	563	825	39.6	34.8	66.1	50.4
NC gear cutting	131	101	166	112	25.6	20.0	35.5	31.5
Non-NC gear cutting	131	177	335	211	11.9	9.7	21.6	9.2
Gear grinding	18	53	62	502	2.1	5.2	9.0	9.7
Sawing or cutting-off	2,682	3,500	1,121	6,847	5.5	10.6	9.2	17.8
Other metal cutting	41,855	3,880	709	2,030	7.7	6.9	5.8	9.4
METAL FORMING								
MACHINES	85,488	3,827	3,668	8,937	145.0	233.7	216.5	286.6
Forging machines	80,382	214	315	1,237	28.4	38.7	23.6	42.3
Air hammers	40	27	76	40	0.9	2.6	1.2	2.1
Other forging	80,342	187	239	1,197	27.5	36.1	22.5	40.2
Bending or forming	296	554	919	1,203	23.3	37.5	39.1	55.3
of which NC	52	116	146	158	19.2	13.6	12.8	28.6
Punching or shearing	287	411	1,261	1,225	21.3	36.8	50.5	61.7
Shearing machines	149	232	333	417	13.6	22.2	24.6	40.1
of which NC	38	22	18	68	3.1	5.2	1.3	23.7
Punching or notching	138	179	928	808	7.7	14.6	25.8	21.6
of which NC	84	103	281	609	5.9	12.3	22.3	19.1
Presses	4,023	970	582	815	40.0	84.3	77.2	78.0
Hydraulic presses	207	176	142	176	11.4	14.0	23.5	11.9
< 100 tons	174	126	87	129	2.0	5.6	3.5	2.9
100 to 300 tons	16	21	26	12	2.2	4.0	6.7	1.7
300 to 1000 tons	16	26	13	12	4.3	2.5	7.5	3.5
> 1000 tons	1	3	16	23	2.9	1.8	5.8	3.8
Other presses	3,816	794	440	639	28.6	70.3	53.7	66.1
Draw benches	76	106	66	340	3.2	13.2	7.4	10.3
Thread rolling machines	40	64	155	55	1.4	1.3	1.0	1.2
Wire working machines	71	172	96	203	6.3	4.3	7.5	10.8
Other metal forming	313	1,336	274	3,859	21.2	17.4	10.1	26.8

Source: Korea Machine Tool Manufacturers' Association (KOMMA)

Note: na = not available

SOUTH KOREA

Exports by Destination

(millions of U.S. dollars)

	1987	1988	1989	1990	1991
TOTAL EXPORTS	\$37.5	\$57.0	\$80.5	\$86.9	\$95.4
United States	14.3	19.3	27.3	19.3	22.1
Japan	3.6	9.4	15.5	17.8	18.9
Indonesia	0.6	0.5	2.0	6.9	8.8
Germany	2.9	5.6	4.9	5.6	5.3
Malaysia	(a)	(a)	1.0	3.5	4.5
Italy	1.0	1.0	3.2	4.4	3.1
Thailand	0.3	0.6	0.9	1.1	2.7
Netherlands	1.3	1.5	2.9	4.6	2.6
United Kingdom	1.1	2.9	2.6	2.2	2.3
Singapore	0.7	1.4	1.1	1.0	1.8
India	2.1	0.8	2.7	4.2	1.7
France	0.8	2.8	3.0	3.5	0.6
Canada	0.5	1.0	1.1	0.6	0.5
Saudi Arabia	0.3	0.2	1.4	1.5	0.4
Other Countries	8.0	10.0	10.9	10.7	20.1

Source: Korea Machine Tool Manufacturers' Association (KOMMA)

SOUTH KOREA

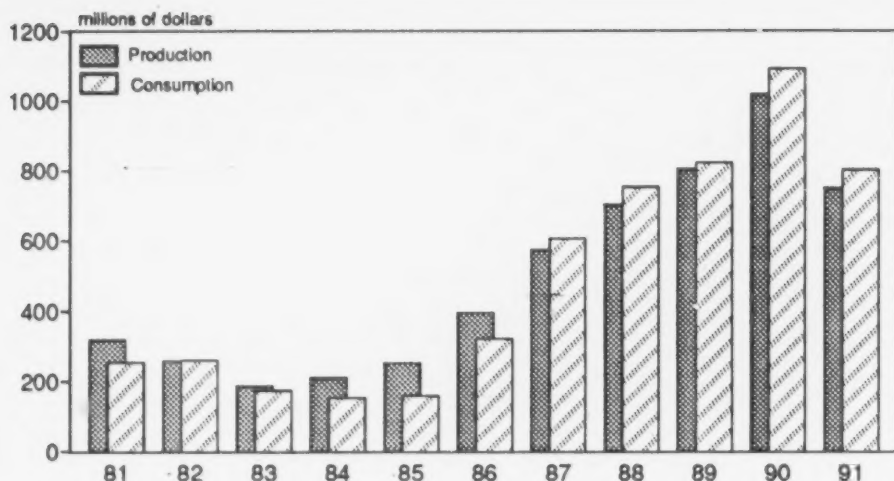
Imports by Country of Origin

(millions of U.S. dollars)

	1987	1988	1989	1990	1991
TOTAL IMPORTS	\$486.1	\$609.3	\$777.3	\$851.1	\$940.9
Japan	317.5	371.1	445.7	489.3	549.2
Germany	44.9	73.2	98.1	105.3	126.8
United States	65.0	90.1	125.3	123.9	101.3
Switzerland	18.6	19.8	31.7	32.5	46.1
Italy	10.0	6.5	10.7	12.9	28.2
Taiwan	11.2	26.1	23.0	22.9	28.1
United Kingdom	6.8	6.9	12.2	18.2	11.3
Other Countries	12.1	15.6	30.6	50.0	49.1

Source: Korea Machine Tool Manufacturers' Association (KOMMA)

Note: a = less than \$50,000



(millions of U.S. dollars)

	Production	Imports	Exports	Consumption	% Import Penetration	Exports as % of Prod.	Employment
1975	\$223.1	\$168.7	\$86.5	\$305.3	55.3%	38.8%	11,600
1976	183.6	132.7	90.8	225.5	58.8	49.5	11,000
1977	190.9	91.4	102.5	179.7	50.9	53.7	10,500
1978	232.2	90.1	147.6	176.8	51.0	63.6	10,003
1979	315.8	91.3	210.8	196.4	46.5	66.8	10,000
1980	352.8	103.2	228.3	227.8	45.3	64.7	9,500
1981	320.0	142.0	207.0	255.0	55.7	64.7	8,800
1982	260.2	176.7	175.5	261.4	67.6	67.4	8,500
1983	188.2	86.2	99.4	175.1	49.2	52.8	7,600
1984	211.5	56.1	113.3	154.4	36.3	53.6	7,300
1985	252.9	58.9	151.5	160.3	36.7	59.9	7,300
1986	396.3	105.8	178.7	323.4	32.7	45.1	7,600
1987	575.0	250.7	218.8	606.8	41.3	38.1	7,700
1988	702.2	311.6	260.2	753.6	41.3	37.1	7,800
1989	806.7	341.6	323.7	824.6	41.4	40.1	7,800
1990	1,015.4	526.8	454.0	1,088.2	48.4	44.7	7,838
1991	750.6	422.8	370.1	803.4	52.6	49.3	7,552

Source: Spanish Machine Tool Manufacturers' Association (AFM)

SPAIN

Production

(millions of U.S. dollars)

	1987	1988	1989	1990	1991
MACHINE TOOL TOTAL	\$575.0	\$702.2	\$806.7	\$1,015.4	\$750.6
of which NC	214.9	283.5	363.0	531.4	453.0
METAL CUTTING TOTAL	437.7	527.0	615.9	719.2	507.0
of which NC	205.2	255.4	330.4	439.3	354.0
Physico-chemical machines	(b)	(b)	26.0	34.3	27.0
Transfer machines	46.4	50.4	47.0	59.0	61.0
of which NC	12.8	10.7	na	35.0	40.0
Machining centers	35.0	47.9	61.8	71.2	47.0
Lathes	88.3	103.3	102.8	112.3	83.0
of which NC	42.5	54.1	50.2	61.2	56.0
Way type unit heads	(b)	(b)	2.5	5.4	(b)
Drilling machines	14.2	17.8	18.9	24.2	17.0
of which NC	-	0.5	0.1	1.0	1.0
Milling machines	140.1	148.9	204.1	261.9	172.0
NC knee type	(d)	(d)	14.7	15.0	(d)
Other NC	(d)	(d)	126.2	174.9	(d)
Non-NC knee type	na	na	35.7	33.7	na
Other non-NC	na	na	27.4	38.4	na
Grinding machines	36.8	44.7	53.2	82.1	43.0
of which NC	11.9	13.3	15.5	33.6	30.0
Boring, boring-milling	11.3	11.1	15.2	22.1	15.0
of which NC	0.0	8.4	8.9	14.0	9.0
Sawing or cutting-off	5.3	13.1	16.8	22.4	17.0
Threading or tapping	(b)	(b)	2.0	5.7	(b)
Shaping or slotting	(b)	(b)	2.4	1.5	(b)
Broaching machines	(b)	(b)	2.0	1.3	(b)
Gear cutting machines	(b)	(b)	0.1	0.2	(b)
Other metal cutting	60.3	89.8	68.0	15.7	23.0
METAL FORMING TOTAL	137.3	175.3	190.8	296.2	244.0
of which NC	9.7	28.1	32.6	92.1	99.0
Forging or die-stamping	(c)	(c)	3.0	2.6	(c)
Bending or forming	12.6	17.0	24.4	34.4	17.0
of which NC	2.5	11.4	8.2	13.2	7.0
Shearing machines	9.0	12.8	26.0	26.7	19.0
of which NC	0.4	5.8	1.2	7.0	3.0
Punching or notching	(c)	(c)	8.5	11.4	9.0
of which NC	(c)	(c)	7.9	11.4	9.0
Presses	43.0	62.8	72.7	75.5	89.0
of which hydraulic	17.1	23.9	26.9	23.5	27.0
Drawing machines	(c)	(c)	1.2	2.0	(c)
Thread rolling	(c)	(c)	6.2	5.7	(c)
Wire working machines	(c)	(c)	5.3	9.2	(c)
Other metal forming	72.7	82.7	59.2	128.6	110.0

Source: Spanish Machine Tool Manufacturers' Association (AFM)

Note: b = included in "other metal cutting"; c = included in "other metal forming"; d = total NC milling production in 1987 was \$80.0 million; in 1988, \$90.1 million; in 1991, \$132.0 million; na = not available

F

SPAIN

Exports by Type of Machine

(millions of U.S. dollars)

	UNITS				VALUE			
	1988	1989	1990	1991	1988	1989	1990	1991
MACHINE TOOL TOTAL	na	na	na	na	\$260.2	\$323.7	\$454.0	\$370.1
METAL CUTTING TOTAL	55,088	39,230	91,581	na	194.3	252.1	355.0	276.0
Physico-chemical	(b)	305	504	(b)	(b)	11.4	14.5	(b)
Laser, light, photon	na	13	90	na	na	0.1	0.2	na
EDM	248	227	219	151	6.0	10.8	13.9	10.0
Other	na	65	195	na	na	0.6	0.4	na
Machining centers	153	123	234	315	13.5	19.9	40.4	28.0
Unit construction	(b)	3	16	(b)	(b)	0.5	1.8	(b)
Multi-station trans.	(b)	44	58	(b)	(b)	14.4	3.4	(b)
Lathes	1,505	1,603	1,821	na	37.0	36.6	52.0	47.0
NC horizontal	170	133	207	na	15.5	13.1	22.1	na
Other NC	34	142	92	69	1.1	1.4	3.0	1.5
Non-NC horizontal	1,255	1,325	1,520	na	18.7	20.0	24.6	na
Other non-NC	46	3	2	na	1.6	2.1	2.3	na
Way type unit heads	(b)	2,024	754	(b)	(b)	6.6	4.1	(b)
Drilling machines	5,088	1,562	13,572	12,281	6.9	8.8	15.0	9.0
of which NC	na	50	84	44	na	1.4	1.7	0.2
Boring-milling	67	60	266	34	2.4	3.8	12.4	4.0
of which NC	13	22	233	17	0.8	1.9	9.0	3.0
Boring machines	59	44	345	22	45	0.8	2.2	2.0
of which NC	44	2	7	3	1.5	(a)	0.7	1.0
Milling machines	7,039	6,902	8,796	4,051	85.6	111.1	168.9	125.0
NC knee type	(d)	289	174	(d)	(d)	8.6	19.6	(d)
Other NC	(d)	2,141	1,004	(d)	(d)	55.9	89.6	(d)
Non-NC knee type	na	810	1,855	na	na	11.8	26.5	na
Other non-NC	na	3,662	5,763	na	na	34.8	33.2	na
Grinding machines	25,171	6,377	20,879	na	23.5	26.5	29.9	28.0
NC surface	na	22	8	na	na	3.5	1.9	na
Other NC grind.	na	28	70	na	na	4.9	7.8	na
Non-NC surface	na	1,596	139	na	na	5.5	5.4	na
Other non-NC grind.	na	154	na	na	na	7.6	9.2	na
Tool or cutter	na	3,206	332	na	na	1.3	2.2	na
Honing or lapping	na	3	6	na	na	(a)	0.1	na
Other	na	1,368	2,522	na	na	3.6	3.3	na
Thread or tap	462	83	1,782	193	2.3	1.6	1.9	1.0
Shape, slot, plane	(b)	239	299	(b)	(b)	2.1	1.5	(b)
Broaching machines	(b)	1	15	(b)	(b)	(a)	0.3	(b)
Gear cutting	127	509	24	34	0.5	1.0	0.6	1.0
Sawing or cut-off	(b)	1,679	na	(b)	(b)	5.2	3.9	(b)
Other metal cutting	12,914	17,672	na	na	6.0	1.8	0.9	31.0
METAL FORMING TOTAL	na	na	na	na	65.9	71.6	98.2	94.0
Forging or stamping	45	109	546	na	2.5	2.4	2.1	4.0
Bending or forming	1,372	1,637	7,010	2,717	14.5	11.2	22.1	15.0
of which NC	353	363	663	1,029	1.6	2.6	7.4	3.0
Presses	55,337	4,725	3,082	12,408	14.0	21.3	25.2	27.0
of which hydraulic	473	208	303	429	2.5	2.9	4.6	3.0
Shearing machines	na	na	na	na	na	11.8	12.1	(c)
of which NC	na	30	312	na	na	0.2	0.8	na
Punching or notching	na	1,744	4,416	na	na	8.1	15.9	(c)
of which NC	na	83	30	na	na	1.5	2.9	na
Drawing machines	51	2,099	82	27	0.7	0.7	1.4	0.1
Thread rolling	161	231	1,310	1,142	1.9	2.5	3.5	2.0
Wire working machines	528	304	217	231	4.1	3.6	5.0	6.0
Other metal forming	na	na	na	na	10.9	10.0	10.9	39.9

Source: Spanish Machine Tool Manufacturers' Association (AFM)

Note: a = less than \$50,000; b = included in "other metal cutting"; c = included in "other metal forming"; d = total NC milling exports in 1988 were 988 units at \$50.8 million; in 1991, 726 units at \$83.0 million; na = not available

SPAIN

Imports by Type of Machine

(millions of U.S. dollars)

	UNITS				VALUE			
	1988	1989	1990	1991p	1988	1989	1990	1991p
MACHINE TOOL TOTAL	184,904	141,829	154,876	na	\$311.6	\$341.6	\$526.8	\$422.8
METAL CUTTING TOTAL	88,358	109,771	138,494	138,279	184.2	168.3	283.0	195.0
Physico-chemical	(b)	27,613	44 ^a	(b)	(b)	9.0	13.6	(b)
Laser, photon	na	23	66	na	na	0.5	2.9	na
EDM	121	117	128	358	8.2	6.9	8.7	7.0
Other	na	27,473	249	na	na	1.6	1.9	na
Machining centers	232	313	327	563	36.8	29.0	38.2	24.0
Unit construction	(b)	373	28	(b)	(b)	0.2	4.3	(b)
Multi-station transfer	(b)	46	120	(b)	(b)	2.3	14.0	(b)
Lathes	1,866	1,976	3,707	4,832	41.6	47.1	74.0	45.8
NC horizontal	478	582	674	2,541	26.8	30.0	58.0	32.0
Other NC	67	78	48	31	1.6	5.0	2.4	1.1
Non-NC horizontal	1,242	1,307	2,975	185	10.0	10.9	12.6	6.0
Other non-NC	79	9	10	2,075	3.2	1.3	1.1	6.7
Way type unit heads	(b)	799	1,379	(b)	(b)	1.1	2.4	(b)
Drilling machines	11,065	11,458	9,260	15,421	5.1	8.6	5.0	5.0
of which NC	168	800	581	326	2.8	6.0	2.3	2.0
Boring-milling	68	31	181	76	1.1	1.0	1.7	7.1
of which NC	6	22	149	47	0.7	0.8	0.4	6.7
Boring machines	37	32	29	36	2.3	0.5	1.3	1.2
Milling machines	1,875	1,269	1,317	4,828	14.1	11.4	16.1	12.0
NC knee type	(d)	63	42	(d)	(d)	3.5	4.2	(d)
Other NC	(d)	157	270	(d)	(d)	3.2	8.3	(d)
Non-NC knee type	na	26	21	na	na	0.7	0.5	na
Other non-NC	na	1,023	984	na	na	4.1	3.1	na
Grinding machines	27,391	41,491	67,456	78,978	34.6	35.8	56.7	38.0
NC surface	na	9	22	na	na	0.4	4.3	na
Non-NC surface	na	2,216	160	na	na	1.6	3.7	na
Other NC grinding	na	29	64	na	na	6.1	7.5	na
Other non-NC grind.	na	1,434	3,469	na	na	8.7	11.7	na
NC tool or cutter	na	12	22	na	na	1.5	3.6	na
Non-NC tool or cut	na	9,987	8,602	na	na	3.5	5.1	na
Honing or lapping	na	29	73	na	na	0.4	3.4	na
Other	na	27,775	55,044	na	na	13.7	17.3	na
Planing machines	6	21	5	(b)	0.2	0.1	0.7	(b)
Shaping or slotting	(b)	22	63	(b)	(b)	0.1	0.5	(b)
Broaching machines	(b)	4	46	(b)	(b)	(a)	3.0	(b)
Gear cutting	25,241	155	4,141	81	4.5	4.6	25.4	8.0
of which NC	8	8	1,019	14	1.6	1.9	22.4	5.0
Threading or tapping	764	468	577	582	1.2	1.1	1.2	2.0
Sawing or cut-off	(b)	22,407	8,824	(b)	(b)	14.4	19.5	(b)
Other metal cutting	10,961	1,293	40,591	32,882	11.4	1.8	4.2	51.9
METAL FORMING TOTAL	96,546	32,058	16,382	na	127.4	172.2	242.4	227.0
Forging or stamping	423	317	618	7,900	21.6	31.1	49.7	77.0
Bending or forming	na	14,189	4,253	4,840	20.7	33.3	38.5	41.0
of which NC	na	190	1,693	729	4.7	9.3	13.0	18.0
Presses	2,286	6,350	6,707	901	20.8	35.1	43.7	25.0
of which hydraulic	302	235	282	317	5.1	18.7	20.0	15.0
Shearing machines	(c)	1,411	1,227	(c)	(c)	18.1	21.4	(c)
of which NC	na	491	113	na	na	8.1	6.9	na
Punching or notching	(c)	766	764	(c)	(c)	15.7	26.4	(c)
of which NC	na	99	295	na	na	11.0	20.6	na
Wire working machines	538	764	313	954	5.5	10.8	11.6	10.0
Thread rolling	275	18	30	na	11.7	0.7	2.8	0.3
Drawing machines	(c)	4,240	178	99	(c)	9.0	6.9	5.0
Other metal forming	91,620	4,003	2,292	na	15.7	19.3	41.4	63.7

Source: Spanish Machine Tool Manufacturers' Association (AFM)

Note: b = included in "other metal cutting"; c = included in "other metal forming"; d = total NC milling imports in 1988 were 1,134 units at \$7.1 million; in 1991, 161 units at \$8.0 million; na = not available

SPAIN

Exports by Destination

(millions of U.S. dollars)

	1987	1988	1989	1990	1991
TOTAL EXPORTS	\$218.8	\$260.2	\$323.7	\$454.0	370.1
Germany	39.3	37.2	53.6	80.0	70.0
France	22.9	30.5	40.1	82.0	68.0
Portugal	12.9	25.2	18.9	29.0	25.0
Italy	11.2	13.1	17.6	30.0	23.0
United States	17.1	22.2	25.7	36.0	21.0
Sweden	7.5	9.1	7.9	12.0	15.0
Argentina	1.2	1.7	(b)	(b)	16.0
Brazil	3.2	2.2	3.4	23.0	14.0
United Kingdom	13.0	17.0	19.7	21.0	10.0
Netherlands	9.1	6.4	6.9	14.0	10.0
Mexico	3.4	2.2	15.2	13.0	11.0
Austria	3.4	3.4	3.8	7.0	7.0
Cuba	7.6	11.0	9.9	5.0	7.0
Switzerland	4.1	4.6	3.4	8.0	6.0
Belgium-Luxembourg	4.0	4.7	4.9	7.0	6.0
India	4.1	2.6	4.8	5.0	5.0
Venezuela	4.3	11.1	6.1	3.0	4.0
Finland	2.8	4.5	5.5	7.0	(b)
Soviet Union	0.9	0.1	4.2	6.0	(b)
Canada	3.7	3.8	3.4	5.0	(b)
Czechoslovakia	2.0	0.7	13.4	0.3	(b)
East Germany	0.1	7.5	8.6	4.0	(c)
Other Countries	41.0	39.4	46.7	57.0	52.0

Source: Spanish Machine Tool Manufacturers' Association (AFM)

SPAIN

Imports by Country of Origin

(millions of U.S. dollars)

	1987	1988	1989	1990	1991
TOTAL IMPORTS	\$250.7	\$311.6	\$341.6	\$526.8	\$423.0
Germany	58.0	73.3	105.6	221.0	146.0
Italy	44.8	69.4	68.3	104.0	90.0
Japan	25.1	48.8	37.7	52.0	61.0
France	28.0	13.8	18.6	19.0	25.0
Switzerland	17.6	18.1	20.2	24.0	23.0
United Kingdom	35.8	24.0	21.3	25.0	22.0
United States	7.4	24.6	11.6	17.0	11.0
Taiwan	1.9	4.6	8.8	9.0	7.0
Belgium-Luxembourg	6.4	4.2	7.0	11.0	4.0
Netherlands	2.1	3.2	2.2	4.0	3.0
Sweden	0.9	2.8	3.1	6.0	(b)
East Germany	7.1	3.3	15.1	4.0	(c)
Other Countries	14.5	27.9	22.1	31.0	31.0

Source: Spanish Machine Tool Manufacturers' Association (AFM)

Note: b = included in "Other Countries"; c = included in "Germany"

SWEDEN
Industry Overview

(millions of U.S. dollars)

	Production	Imports	Exports	Consumption	% Import Penetration	Exports as % of Prod.
1980	\$234.0	\$242.8	\$240.6	\$236.2	102.8%	102.8%
1981	210.9	191.6	164.3	238.2	80.4	77.9
1982	165.0	151.2	138.5	177.7	85.1	83.9
1983	142.4	129.6	114.5	157.5	82.3	80.4
1984	142.1	127.8	124.9	145.0	88.1	87.9
1985	161.4	157.0	139.4	179.0	87.7	86.4
1986	210.7	229.3	164.6	275.4	83.3	78.1
1987	223.0	312.3	192.8	342.5	91.2	86.5
1988	243.7	340.5	213.7	370.5	91.9	87.7
1989	236.6	354.0	215.8	374.8	94.5	91.2
1990	255.7	348.1	289.0	314.8	110.6	113.0
1991	na	252.8	239.5	na	na	na

Source: The Association of Swedish Engineering Industries

SWEDEN
Production

(millions of U.S. dollars)

	UNITS				VALUE			
	1987	1988	1989	1990	1987	1988	1989	1990
MACHINE TOOL TOTAL	na	na	na	na	\$223.0	\$243.7	\$236.6	\$255.7
METAL CUTTING TOTAL	na	na	na	na	133.9	118.5	119.2	na
Machining centers	—	2	—	na	—	(a)	—	na
Drilling or boring	6,258	na	na	na	13.6	4.4	4.1	na
of which NC	—	na	na	na	—	3.5	3.1	na
Grinding machines	40,435	na	na	na	60.9	47.3	45.1	na
of which NC	40	89	97	na	4.7	42.3	38.1	na
Lathes	296	113	na	na	28.3	22.8	31.4	na
of which NC	na	—	na	na	na	—	9.4	na
Milling, bore-mill	175	na	na	na	36.1	32.2	29.3	na
of which NC	164	na	na	na	26.0	29.4	26.6	na
Thread or tap	na	na	722	na	0.5	5.6	5.6	na
Sawing or cut-off	201	140	130	na	0.6	0.4	0.4	na
Other metal cutting	na	na	na	na	na	6.0	6.5	na
METAL FORMING TOTAL	na	na	na	na	89.1	125.2	117.5	na
Forging machines	na	na	na	na	1.3	9.0	7.6	na
Hydraulic presses	82	na	na	na	19.7	38.5	37.1	na
Other presses	67	na	na	na	3.2	3.8	(b)	na
Bending, folding	1,070	na	na	na	15.7	19.4	19.8	na
Shearing machines	(c)	537	na	na	(c)	11.6	12.2	na
Punching, incl.								
punch presses	249	na	na	na	11.5	17.5	16.5	na
Other metal forming	na	na	na	na	37.0	25.4	28.9	na

Source: The Association of Swedish Engineering Industries

Note: a = less than \$50,000; b = included in "other metal forming"; c = included in "punching, incl. punch presses"; na = not available

SWEDEN

*Imports and Exports
by Type of Machine*

(millions of U.S. dollars)

	IMPORTS				EXPORTS			
	1988	1989	1990	1991	1988	1989	1990	1991
MACHINE TOOL TOTAL	\$340.5	\$354.0	\$348.1	\$252.8	\$213.7	\$215.8	\$289.0	\$239.5
METAL CUTTING TOTAL	249.0	271.3	256.3	191.8	121.4	134.1	167.0	147.3
Physico-chemical	1.5	0.6	3.9	3.0	—	—	(a)	0.1
Machining centers	70.8	74.8	67.9	58.1	8.2	9.4	15.9	10.2
Lathes	64.9	75.1	69.0	51.3	19.2	22.9	29.9	24.1
NC automatic	36.4	55.4	48.8	33.0	14.5	16.2	20.4	17.1
Non-NC automatic	13.4	9.1	8.2	5.8	3.5	4.8	7.2	4.9
Other NC	11.7	8.4	10.5	9.9	0.2	1.1	0.5	0.4
Other non-NC	3.4	2.2	1.5	2.6	0.9	0.8	1.8	1.7
Drilling or boring	9.2	10.8	11.0	5.2	10.8	12.2	13.1	13.6
NC	5.2	7.8	8.3	3.8	1.3	1.9	2.7	5.1
Non-NC	4.0	3.0	2.7	1.4	9.4	10.3	10.4	8.5
Milling, bore-mill	33.6	29.2	41.2	19.7	8.6	6.5	8.6	3.9
NC	27.5	20.9	33.0	15.2	3.9	2.9	4.8	1.7
Non-NC	6.1	8.3	8.2	4.5	4.7	3.6	3.8	2.2
Threading or tapping	1.3	0.5	0.8	0.3	2.1	1.6	1.8	1.3
Grinding machines	34.5	45.2	33.4	27.7	63.5	74.8	91.5	87.3
NC	15.0	27.9	17.0	17.6	49.0	57.8	76.1	69.9
Non-NC	19.6	17.3	16.4	10.1	14.6	17.0	15.4	17.4
Planers or shapers	1.0	0.4	0.1	0.1	0.9	0.2	0.2	0.1
Sawing or cutting-off	11.3	13.3	12.6	7.5	2.2	0.9	1.3	1.3
Broaching machines	1.2	0.1	0.7	—	0.2	(a)	0.1	—
Gear cutting machines	2.5	4.6	1.8	8.6	0.1	1.3	0.4	0.2
Other metal cutting	17.2	16.8	13.8	8.7	5.6	4.3	4.2	5.1
METAL FORMING TOTAL	91.5	82.7	91.7	60.9	92.3	81.7	122.0	92.2
Forging or hammers	2.2	3.0	5.0	1.3	6.4	0.8	1.3	0.9
Punching or shearing	33.5	33.3	32.0	15.3	29.9	22.7	28.2	22.0
Bend, fold, form	23.0	18.2	26.9	20.0	11.4	20.6	29.9	27.4
Hydraulic presses	11.9	11.4	6.6	5.1	30.8	14.6	43.0	26.5
Other metal forming	20.9	16.9	21.1	19.3	13.8	23.1	19.7	15.4
Machine vices & chucks	19.8	18.3	20.5	14.9	40.6	42.0	42.3	36.0
Other parts & access.	54.7	71.9	82.6	63.9	55.2	67.0	89.8	67.0

Source: The Association of Swedish Engineering Industries

Note: a = less than \$50,000

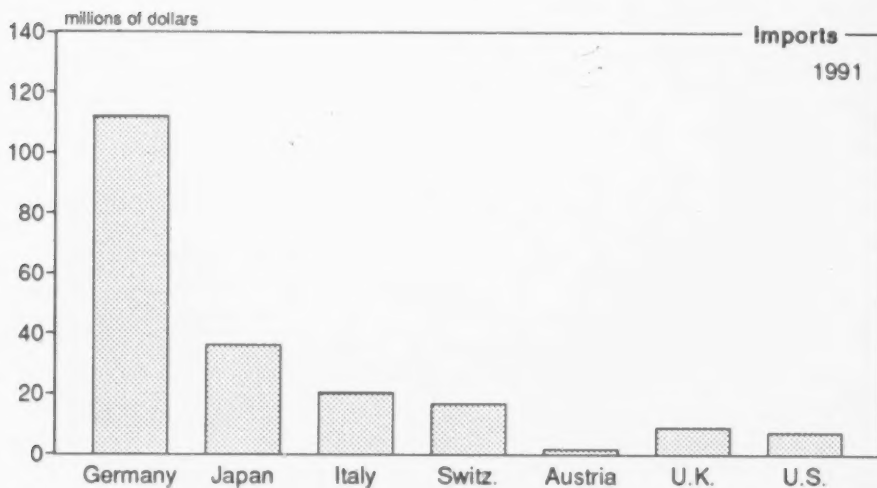
SWEDEN

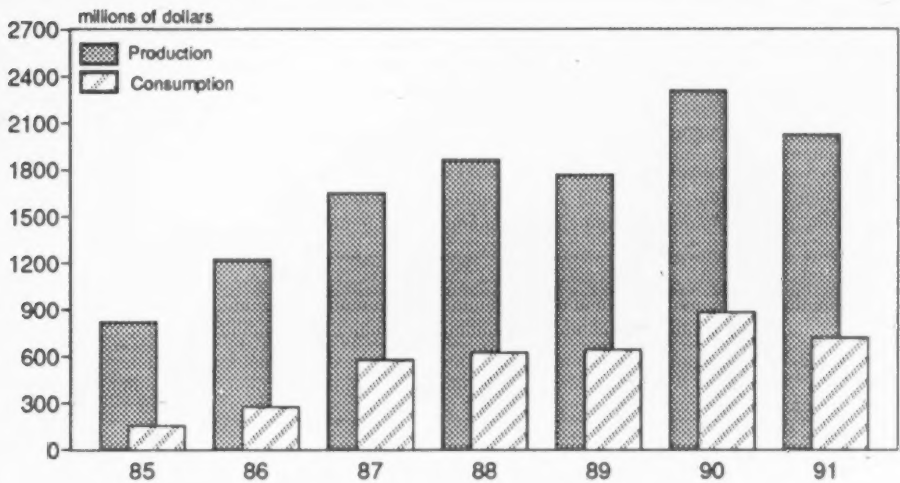
Imports and Exports
by Country

(millions of U.S. dollars)

Country	IMPORTS FROM				EXPORTS TO			
	1988	1989	1990	1991	1988	1989	1990	1991
TOTAL	\$340.5	\$354.0	\$348.1	\$252.8	\$213.7	\$215.8	\$289.0	\$239.5
Austria	2.8	5.7	12.1	1.8	2.4	3.8	5.3	5.4
Czechoslovakia	4.1	3.8	3.6	2.8	2.2	2.4	1.6	1.5
Denmark	11.3	10.3	7.9	5.5	13.3	13.2	15.8	15.7
Finland	6.9	6.1	9.7	9.1	12.0	11.7	17.8	8.4
France	7.3	6.8	10.9	4.0	10.5	17.4	18.3	11.3
Germany	127.7	142.2	125.2	112.2	35.5	30.4	55.3	44.8
Italy	36.4	34.4	26.4	20.4	7.3	5.9	8.7	7.9
Japan	62.3	60.9	68.1	36.3	2.5	4.7	2.8	2.6
Netherlands	5.5	3.8	5.9	2.4	4.7	5.6	9.5	9.5
Norway	2.3	1.4	1.0	0.6	7.8	6.6	8.1	7.2
Poland	1.1	0.7	0.6	0.5	5.8	3.8	5.3	2.4
Spain	8.5	7.8	9.4	7.4	2.1	3.7	4.1	2.5
Switzerland	23.4	23.9	21.8	16.9	3.7	4.2	7.6	3.9
Taiwan	11.1	16.3	11.4	6.5	1.1	0.6	1.4	0.5
United Kingdom	11.2	11.5	11.5	8.9	24.3	25.9	19.9	18.7
United States	4.9	7.0	7.9	7.4	27.7	26.5	47.2	26.2
USSR	0.6	0.6	0.6	0.5	6.8	4.4	7.3	3.7
Other Countries	3.2	3.3	14.1	9.7	23.5	15.1	53.0	67.3

Source: The Association of Swedish Engineering Industries





(millions of U.S. dollars)

	Production	Imports	Exports	Consumption	% Import Penetration	Exports as % of Prod.
1985	\$ 822.1	\$ 170.0	\$ 836.3	\$155.8	109.1%	101.7%
1986	1,223.0	312.2	1,260.0	275.2	113.4	103.0
1987	1,652.4	360.1	1,435.8	576.7	62.4	86.9
1988	1,865.0	383.2	1,625.7	622.5	61.6	87.2
1989	1,769.7	426.6	1,556.6	639.7	66.7	88.0
1990	2,311.5	585.9	2,016.7	880.7	66.5	87.2
1991	2,027.2*	422.7	1,730.2	719.7	58.7	85.3

Source: The Swiss Association of Machinery Manufacturers (VSM)

Note: * AMT estimate: production including parts and accessories was \$2,534.2 million in 1991.

SWITZERLAND
Exports by Type of Machine

(millions of U.S. dollars)

	UNITS			VALUE		
	1989	1990	1991	1989	1990	1991
MACHINE TOOL TOTAL	30,999	32,392	na	\$1,556.6	\$2,016.7	\$1,730.2
METAL CUTTING TOTAL	20,484	22,083	na	1,244.4	1,602.6	1,328.6
Physico-chemical machines	2,804	2,868	na	319.6	430.6	321.1
Laser, light or photon	139	207	na	36.1	74.0	na
EDM	2,108	2,168	na	282.8	356.0	na
Other	557	493	na	0.7	0.5	na
Machining centers	213	141	na	47.2	46.1	(c)
Unit construction machines	80	73	na	23.8	31.9	(c)
Multi-station transfer	188	260	na	45.1	74.2	(c)
Lathes	3,988	4,271	na	179.4	214.3	188.1
NC horizontal	684	816	na	83.5	110.3	na
Non-NC horizontal	2,144	1,618	na	68.6	71.9	na
Other NC	165	120	na	16.4	13.2	na
Other non-NC	995	1,717	na	10.9	18.9	na
Way type unit heads	107	147	na	7.7	9.9	(b)
Drilling machines	782	643	na	28.5	27.2	(b)
of which NC	109	93	na	17.8	18.3	(b)
Boring-milling machines	1,330	1,752	na	85.8	136.8	(b)
of which NC	619	801	na	63.3	105.1	(b)
Boring machines	70	81	na	0.6	2.0	(b)
Milling machines	1,473	1,615	na	68.0	66.3	(b)
NC knee type	252	110	na	28.7	23.1	(b)
Non-NC knee type	206	141	na	9.5	6.2	(b)
Other NC	90	81	na	18.5	23.0	(b)
Other non-NC	925	1,283	na	11.3	14.0	(b)
Threading or tapping	360	319	na	1.5	2.7	(b)
Grinding machines	6,861	7,411	na	333.1	429.1	338.1
NC surface	97	102	na	8.1	11.5	na
Non-NC surface	305	393	na	13.1	17.4	na
Other NC grinding	905	1,040	na	170.2	226.0	na
Other non-NC grinding	2,152	1,657	na	90.7	103.9	na
NC tool or cutter	90	82	na	6.4	9.1	na
Non-NC tool or cutter	2,197	2,295	na	21.0	27.3	na
Honing or lapping	174	129	na	6.8	7.8	na
Other	941	1,713	na	16.7	26.1	na
Planing machines	69	62	na	2.3	0.5	(b)
Shaping or slotting	19	24	na	1.1	0.5	(b)
Broaching machines	14	12	na	0.1	0.9	(b)
Gear cutting machines	575	633	na	92.9	119.4	(b)
Sawing or cutting-off	1,468	1,634	na	6.7	7.9	(b)
Other metal cutting	83	137	na	1.1	2.2	338.2
METAL FORMING TOTAL	10,515	10,309	na	312.0	414.1	401.6
Forging or die-stamping	330	205	na	28.9	44.1	na
Bending or forming	3,907	4,087	na	96.7	131.6	na
of which NC	540	574	na	64.5	82.6	na
Shearing machines	901	531	na	9.2	16.4	na
of which NC	96	113	na	3.7	6.4	na
Punching or notching	681	699	na	76.7	101.6	na
of which NC	127	217	na	26.0	44.6	na
Presses	1,070	1,419	na	28.3	31.0	na
Drawing machines	46	42	na	2.7	0.6	na
Thread-rolling machines	37	24	na	1.0	1.2	na
Wire working machines	789	630	na	37.9	46.3	na
Other metal forming	2,754	2,672	na	30.6	41.4	na

Source: The Swiss Association of Machinery Manufacturers (VSM)

Note: b = included in "other metal cutting"; c = combined total is \$143.1 million; na = not available

SWITZERLAND
Exports by Destination

(millions of U.S. dollars)

	1987	1988	1989	1990	1991
TOTAL EXPORTS	\$1,435.8	\$1,625.7	\$1,556.6	\$2,016.7	\$1,730.2
Germany	394.3	356.2	379.4	576.2	552.4
France	113.1	133.2	147.9	214.0	152.0
Italy	103.8	128.7	111.8	156.3	134.8
United States	119.2	112.6	117.6	158.1	134.3
USSR	108.2	169.0	138.2	155.2	119.0
Japan	47.3	66.6	84.4	115.5	97.8
United Kingdom	36.7	53.2	49.5	61.3	77.5
Austria	27.7	31.3	29.4	40.4	42.5
Iran	27.5	29.3	23.0	45.2	41.0
China	35.1	45.1	30.8	35.3	40.2
South Korea	21.1	22.4	32.1	34.8	37.1
Netherlands	20.3	26.7	20.0	36.0	26.2
Czechoslovakia	27.6	30.1	24.8	26.8	23.6
Belgium-Luxembourg	16.5	18.6	22.6	22.6	23.2
Sweden	22.5	21.6	24.9	29.8	20.9
Spain	19.0	20.3	21.9	31.2	20.8
Taiwan	12.5	15.3	14.5	13.7	19.7
Denmark	14.2	9.4	11.7	17.9	14.9
India	27.2	24.5	16.8	19.2	13.2
Thailand	4.8	13.2	7.3	14.4	12.4
Mexico	4.9	4.7	6.3	6.6	10.9
Brazil	10.7	17.9	21.5	20.4	9.7
Poland	18.2	23.9	25.2	17.3	8.5
Singapore	6.5	9.7	8.6	10.7	8.3
Canada	13.6	10.1	7.5	6.6	4.5
Israel	8.7	11.2	3.5	4.4	3.8
East Germany	48.9	91.0	53.4	16.4	(b)
Yugoslavia	14.4	16.8	13.1	12.4	(c)
Bulgaria	44.4	16.1	24.6	11.6	(c)
Iraq	9.1	22.3	23.9	10.1	(c)
Other Countries	57.8	74.6	60.5	96.4	76.3

Source: The Swiss Association of Machinery Manufacturers (VSM)

SWITZERLAND
Imports by Country of Origin

(millions of U.S. dollars)

	1987	1988	1989	1990	1991
TOTAL IMPORTS	\$360.1	\$383.2	\$426.6	\$585.9	\$422.7
Germany	193.7	195.5	203.6	292.8	202.9
Italy	47.5	42.0	53.8	77.5	63.4
Japan	48.6	61.4	77.0	100.3	56.8
France	18.7	25.3	25.6	30.3	29.1
United Kingdom	7.5	13.3	13.1	19.7	14.3
Austria	5.7	8.3	9.0	11.7	10.8
Spain	4.2	4.2	3.2	5.6	6.6
Taiwan	7.8	4.1	5.6	7.3	5.7
United States	3.8	5.9	8.1	5.0	5.0
Belgium-Luxembourg	2.2	2.2	4.6	3.2	4.9
Netherlands	3.8	4.4	4.9	4.5	4.5
Sweden	3.7	3.9	3.6	7.1	3.8
Czechoslovakia	2.4	2.0	2.5	4.5	3.8
Denmark	2.3	2.1	3.3	4.4	3.1
East Germany	0.5	1.3	0.9	1.4	(b)
USSR	2.3	1.6	2.8	1.4	(c)
Other Countries	5.4	5.4	4.9	9.4	8.1

Source: The Swiss Association of Machinery Manufacturers (VSM)

Note: b = included in Germany; c = included in "Other Countries"

SWITZERLAND
Imports by Type of Machine

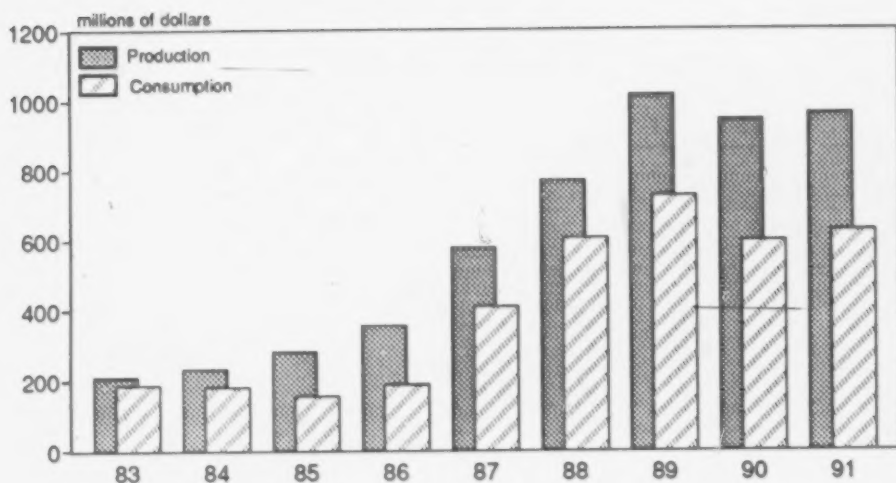
(millions of U.S. dollars)

	UNITS			VALUE		
	1989	1990	1991	1989	1990	1991
MACHINE TOOL TOTAL	60,676	60,982	na	\$426.6	\$585.9	\$422.7
METAL CUTTING TOTAL	50,608	48,048	na	331.6	453.6	329.9
Physico-chemical machines	879	446	na	12.1	16.6	14.0
Laser, light or photon	40	69	na	4.4	7.3	na
EDM	234	107	na	6.8	8.7	na
Other	605	270	na	0.8	0.6	na
Machining centers	410	599	na	75.2	101.4	(c)
Unit construction machines	97	169	na	2.2	12.9	(c)
Multi-station transfer	39	86	na	3.7	6.6	(c)
Lathes	2,733	5,955	na	106.9	153.5	98.7
NC horizontal	847	2,410	na	78.2	119.2	na
Non-NC horizontal	1,305	1,135	na	11.1	13.7	na
Other NC	131	1,135	na	11.7	13.1	na
Other non-NC	450	1,275	na	5.9	7.4	na
Way type unit heads	26	41	na	1.3	1.6	(b)
Drilling machines	7,395	8,716	na	10.6	13.0	(b)
of which NC	139	112	na	4.1	4.8	(b)
Boring-milling machines	423	412	na	13.0	14.8	(b)
of which NC	120	140	na	10.2	12.5	(b)
Boring machines	39	103	na	0.5	1.1	(b)
Milling machines	2,389	1,239	na	39.8	39.8	(b)
NC knee type	44	53	na	2.0	3.8	(b)
Non-NC knee type	142	220	na	1.3	2.0	(b)
Other NC	397	297	na	29.0	23.3	(b)
Other non-NC	1,806	669	na	7.5	10.7	(b)
Threading or tapping	1,665	1,658	na	2.5	2.7	(b)
Grinding machines	28,055	21,805	na	40.9	58.1	53.7
NC surface	33	58	na	3.2	6.9	na
Non-NC surface	326	288	na	6.3	6.2	na
Other NC grinding	90	108	na	6.9	16.3	na
Other non-NC grinding	8,544	2,390	na	10.3	11.6	na
NC tool or cutter	50	34	na	2.0	1.7	na
Non-NC tool or cutter	9,050	5,164	na	2.8	3.6	na
Honing or lapping	272	540	na	3.4	3.3	na
Other	9,690	13,223	na	6.0	8.4	na
Planing machines	8	8	na	0.2	0.3	(b)
Shaping or slotting	30	15	na	0.1	0.3	(b)
Broaching machines	10	5	na	0.1	0.4	(b)
Gear cutting machines	84	116	na	3.6	4.4	(b)
Sawing or cutting-off	5,453	6,010	na	17.7	23.3	(b)
Other metal cutting	873	665	na	1.2	3.0	78.3
METAL FORMING TOTAL	10,068	12,934	na	95.0	132.3	92.7
Forging or die-stamping	92	155	na	7.6	5.6	na
Bending or forming	3,058	2,755	na	25.7	36.4	na
of which NC	366	242	na	12.0	16.1	na
Shearing machines	1,963	2,420	na	16.0	26.9	na
of which NC	74	114	na	4.0	12.2	na
Punching or notching	886	1,948	na	10.4	16.8	na
of which NC	79	106	na	5.0	10.3	na
Presses	3,062	4,356	na	20.3	29.6	na
Drawing machines	92	82	na	5.0	6.1	na
Thread-rolling machines	15	27	na	0.4	1.2	na
Wire working machines	139	152	na	3.3	2.4	na
Other metal forming	761	1,039	na	6.2	7.3	na

Source: The Swiss Association of Machinery Manufacturers (VSM)

Note: b = included in "other metal cutting"; c = combined total is \$85.2 million; na = not available

F



(millions of U.S. dollars)

	Production	Imports	Exports	Consumption	% Import Penetration	Exports as % of Prod.
1983	\$211.0	\$113.0	\$135.4	\$188.6	59.9%	64.2%
1984	233.2	113.3	164.8	181.7	62.4	70.7
1985	282.2	75.7	202.7	155.5	49.7	72.5
1986	356.7	80.6	248.5	188.8	42.7	69.7
1987	577.8	214.8	381.7	410.9	52.8	66.1
1988	770.0	333.2	496.7	606.6	54.9	64.5
1989	1,016.5	370.5	659.7	727.3	50.9	64.9
1990	943.7	294.2	640.4	597.5	49.2	67.9
1991p	962.6	289.4	624.9	627.1	46.1	64.9

Source: Taiwan Association of Machinery Industry (TAMI)

Note: p = preliminary

TAIWAN

Exports by Type of Machine

(millions of U.S. dollars)

	UNITS			VALUE		
	1989	1990	1991	1989	1990	1991
MACHINE TOOL TOTAL	1,742,060	910,191	874,910	\$659.7	\$640.4	\$624.9
METAL CUTTING TOTAL	1,732,623	898,911	861,017	548.9	507.1	469.6
EDM	2,089	2,223	2,029	34.0	29.2	30.7
of which NC	129	91	89	3.6	3.0	2.9
Other physico-chemical	65	na	na	1.5	4.1	3.5
Machining centers	1,617	1,578	1,508	85.1	87.7	80.5
Lathes	19,457	14,127	14,573	140.0	150.7	131.3
NC horizontal	1,013	(d)	(d)	49.8	67.0	(d)
Other NC lathes	44	(d)	(d)	2.0	2.4	(d)
Non-NC horizontal	18,355	na	na	87.9	67.6	na
Other non-NC lathes	45	na	na	0.3	13.7	na
Drilling machines	703,000	428,721	601,319	80.4	68.4	70.0
of which NC	32	86	na	0.4	0.4	0.1
Boring, boring-milling	191	213	188	2.9	3.4	7.1
of which NC	12	7	na	1.4	1.1	3.1
Milling machines	15,713	13,565	12,924	81.4	74.3	66.3
NC knee type	356	220	na	4.7	3.4	3.1
Other NC	357	366	na	7.5	7.0	7.1
Non-NC knee type	14,956	12,415	na	68.3	58.5	5.5
Other non-NC	44	564	na	0.8	5.3	50.6
Threading or tapping	459	296	427	3.4	1.8	5.4
Grinding machines	934,815	403,718	191,279	71.9	60.2	48.6
NC surface	7	10	na	0.4	0.3	0.1
Non-NC surface	4,192	5,307	na	32.8	37.1	30.0
Other NC grinding	5	7	na	0.3	0.7	0.3
Other non-NC grinding	3,454	1,140	na	6.2	6.5	6.6
Honing or lapping	370	na	na	1.2	0.9	0.5
Other, incl. bench	926,786	397,254	185,686	31.1	14.7	11.1
Planing machines	2	6	na	0.5	0.5	0.3
Shaping or slotting	99	117	na	0.8	0.8	0.6
Broaching machines	5	na	na	0.1	0.3	(a)
Gear cutting machines	36	119	55	0.3	0.9	0.4
Sawing or cutting-off	54,100	33,588	35,816	28.7	21.0	21.6
Other metal cutting	975	640	954	19.0	3.1	3.1
METAL FORMING TOTAL	9,437	11,280	13,893	110.9	133.2	155.3
Forging or die-stamping	1,030	210	na	9.1	7.8	11.2
Bending or forming	1,383	2,044	na	4.1	3.1	3.5
of which NC	1	6	na	(a)	0.2	0.4
Punching or shearing	1,723	2,455	na	23.7	21.1	28.0
NC shearing	1	3	na	(a)	0.1	0.1
Non-NC shearing	1,298	1,216	na	18.3	18.9	24.0
NC punch or notch	21	9	na	1.3	0.4	0.6
Non-NC punch or notch	403	1,227	na	4.1	1.7	3.3
Presses	1,949	2,073	na	18.9	29.1	45.5
of which hydraulic	432	1,265	na	7.4	12.5	21.1
Drawing machines	624	334	na	5.9	5.4	8.9
Thread rolling machines	309	127	na	3.3	2.0	3.0
Wire working machines	1,022	2,112	na	19.4	33.9	24.6
Other metal forming	1,397	1,925	na	26.4	30.9	30.6

Source: Taiwan Association of Machinery Industry (TAMI)

Note: a = less than \$50,000; b = included in "other metal cutting"; c = total exports of NC milling in 1988 were 152 units at \$6.5 million; d = total exports of NC lathes in 1988 were 751 units at \$33.9 million; in 1990, 1,238 units at \$69.4 million; in 1991, 854 units at \$45.2 million; na = not available

TAIWAN

Imports by Type of Machine

(millions of U.S. dollars)

	1987	1988	1989	1990	1991
MACHINE TOOL TOTAL	\$214.8	\$333.2	\$370.5	\$294.2	\$289.4
METAL CUTTING TOTAL	123.0	165.9	217.4	178.7	172.5
Physico-chemical machines	(b)	(b)	26.2	20.9	34.4
Laser, light, photon	na	na	3.4	8.6	8.5
EDM	15.3	19.7	8.4	11.2	22.3
Other physico-chemical	na	na	14.4	1.0	3.6
Machining centers	3.4	9.4	41.9	34.6	37.0
Unit construction	(b)	(b)	0.1	0.1	0.2
Multi-station transfer	(b)	(b)	2.5	1.6	2.3
Lathes	15.8	19.4	21.9	20.1	21.2
NC horizontal	na	(c)	3.0	4.0	4.6
Other NC lathes	na	(c)	8.2	12.8	13.5
Non-NC horizontal	na	na	0.4	0.3	0.2
Other non-NC lathes	na	na	10.3	3.1	2.9
Way type unit heads	(b)	(b)	(a)	(a)	(a)
Drilling machines	16.4	16.8	9.1	7.1	7.5
of which NC	4.3	6.0	3.1	5.8	6.0
Boring-milling machines	(b)	(b)	6.8	6.7	4.9
of which NC	na	na	3.8	6.5	4.2
Boring machines	(b)	(b)	3.3	4.4	1.2
of which NC	na	na	0.3	4.0	0.5
Milling machines	19.4	21.6	12.8	11.7	11.9
NC knee type	na	(d)	0.4	0.8	0.1
Other NC	na	(d)	5.5	6.4	7.4
Non-NC knee type	na	na	0.5	0.2	0.2
Other non-NC	na	na	6.4	6.0	4.2
Threading or tapping	3.5	6.1	6.0	3.9	6.5
Grinding machines	24.1	32.3	66.1	44.8	27.8
NC surface	na	na	1.1	3.9	1.6
Other NC grinding	na	na	5.3	15.8	9.5
Non-NC surface	na	na	2.5	1.3	1.3
Other non-NC grinding	na	na	13.4	6.8	4.9
NC tool or cutter	na	na	1.0	0.4	1.4
Non-NC tool or cutter	na	na	1.8	1.3	0.9
Honing or lapping	na	na	9.4	5.2	4.2
Other	na	na	31.7	10.0	4.3
Plane, shape, slot	(b)	(b)	0.1	0.7	0.2
Broaching machines	(b)	(b)	0.9	0.5	0.5
Gear cutting machines	7.9	6.5	7.8	8.7	4.5
Sawing or cutting-off	1.2	2.8	6.5	7.7	10.2
Other metal cutting	31.3	51.0	5.4	3.2	2.6
METAL FORMING TOTAL	91.8	167.3	153.0	117.5	116.8
Forging or die-stamping	na	na	17.6	17.1	22.6
Bending or forming	na	na	13.2	21.2	17.5
of which NC	na	na	3.0	6.8	6.7
Punching or shearing	na	na	38.9	27.2	34.2
Shearing machines	na	na	19.7	14.4	19.2
of which NC	na	na	3.9	6.7	5.4
Punching or notching	na	na	19.2	12.8	15.0
of which NC	na	na	4.5	7.7	8.9
Presses	na	na	24.4	9.9	15.6
of which hydraulic	na	na	9.3	2.2	5.4
Drawing machines	na	na	23.0	17.8	8.5
Thread rolling machines	na	na	0.5	0.7	0.6
Wire working machines	na	na	5.2	9.9	10.4
Other metal forming	na	na	30.1	13.7	7.4

Source: Taiwan Association of Machinery Industry (TAMI)

Note: a = less than \$50,000; b = included in "other metal cutting"; c = total imports of NC lathes in 1988 were \$9.0 million; d = total imports of NC milling machines in 1988 were \$3.9 million; na = not available

TAIWAN
Exports by Destination

(millions of U.S. dollars)

	1987	1988	1989	1990	1991
TOTAL EXPORTS	\$381.7	\$496.7	\$659.7	\$640.4	\$624.9
United States	111.8	130.3	190.5	120.1	104.8
Hong Kong	17.0	39.0	29.2	51.1	76.5
Germany	21.9	25.4	38.2	41.1	43.8
Malaysia	(b)	6.6	11.7	37.8	43.4
Thailand	6.3	21.7	21.1	37.0	35.8
Japan	9.2	19.1	39.3	38.1	35.2
South Korea	7.8	23.1	16.9	19.5	29.7
Indonesia	3.2	8.9	11.3	22.7	27.7
France	12.9	19.2	24.7	29.3	27.3
Italy	11.2	20.7	40.4	38.4	27.2
United Kingdom	19.4	33.8	47.0	32.8	22.1
Singapore	5.8	12.3	16.8	20.5	20.8
Canada	22.7	23.7	27.2	20.1	12.9
Netherlands	(b)	9.2	11.4	16.3	12.2
Australia	13.3	19.0	23.6	11.1	9.1
Mexico	(b)	(b)	(b)	7.0	7.7
Israel	(b)	(b)	(b)	(b)	6.8
South Africa	6.9	19.2	23.4	12.6	6.8
Spain	(b)	5.1	7.6	8.2	6.4
Other Countries	52.9	60.4	79.4	76.7	68.7

Source: Taiwan Association of Machinery Industry (TAMI)

Note: The total for 1987 includes \$62 million not classified by country; b = included in "Other Countries"

TAIWAN
Imports by Country of Origin

(millions of U.S. dollars)

	1987	1988	1989	1990	1991
TOTAL IMPORTS	\$214.8	\$333.2	\$370.5	\$294.2	\$289.4
Japan	139.1	223.0	229.5	183.6	191.8
United States	15.9	33.6	47.6	38.5	38.5
Germany	14.4	31.7	35.3	32.4	26.1
Switzerland	13.3	14.3	12.9	12.7	8.9
Italy	5.5	10.1	6.5	7.1	7.0
United Kingdom	(b)	4.2	11.2	5.0	5.0
Austria	(b)	3.0	10.6	0.6	0.5
Other Countries	12.2	13.4	16.8	14.3	11.6

Source: Taiwan Association of Machinery Industry (TAMI)

Note: The total for 1987 includes \$15.3 million not classified by country; b = included in "Other Countries"

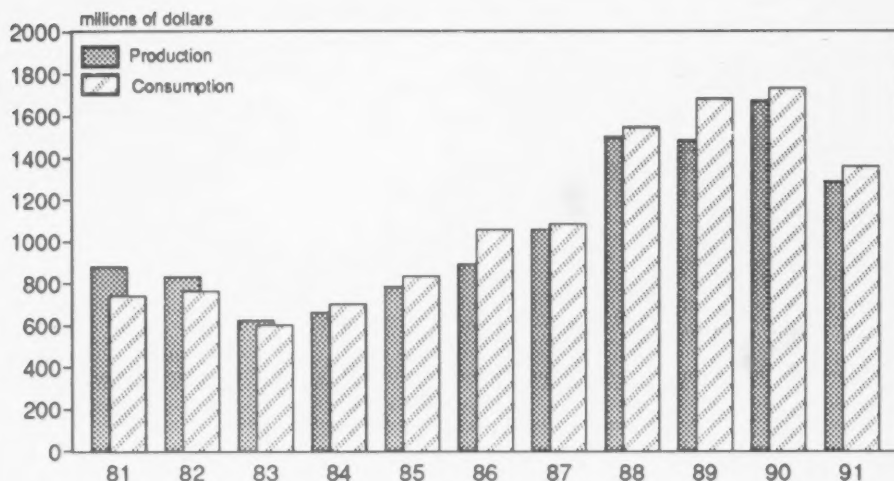
THAILAND

Imports by Type of Machine

(thousands of U.S. dollars)

	UNITS			VALUE		
	1988	1989	1990	1988	1989	1990
MACHINE TOOL TOTAL	56,842	61,172	135,894	\$191,391	\$322,924	\$381,076
METAL CUTTING TOTAL	48,122	50,842	117,269	115,725	215,769	237,776
Physico-chemical machines	2,405	314	264	4,247	4,353	10,665
Laser, light or photon	1	2	6	15	28	204
Ultrasonic	2	75	8	3	5	27
EDM	1,718	207	220	2,847	4,046	8,957
Other physico-chemical	684	30	30	1,381	275	1,478
Machining centers	142	267	205	4,344	6,663	13,778
Unit construction machines	33	8	676	157	19	97
Multi-station transfer	3	18	10	145	65	84
Lathes	6,536	7,845	9,679	42,680	61,650	62,320
NC horizontal	98	227	151	2,497	20,727	5,561
Other NC lathes	48	66	146	3,988	3,500	7,369
Non-NC horizontal	5,029	5,341	5,505	19,245	17,627	14,469
Other non-NC lathes	1,361	2,211	3,877	16,949	19,795	34,922
Way type unit heads	1,063	1,162	1,054	685	2,198	1,466
Drilling machines	16,099	13,200	19,795	5,714	12,619	14,225
of which NC	28	56	73	967	1,545	3,118
Boring, boring-milling	350	620	643	5,165	7,503	13,129
Boring-milling machines	144	321	251	4,197	3,778	7,412
of which NC	16	8	20	1,298	255	3,042
Boring machines	206	299	392	968	3,725	5,717
Milling machines	1,480	1,517	1,930	8,912	16,105	12,682
NC knee-type	17	26	7	728	324	279
Other NC milling	81	43	58	867	2,646	1,751
Non-NC knee-type	202	165	278	1,892	2,277	2,714
Other non-NC milling	1,180	1,283	1,587	5,424	10,858	7,937
Threading or tapping	836	2,620	3,116	2,740	6,668	11,356
Grinding or finishing	5,653	10,401	62,290	21,778	63,888	60,680
NC surface	160	179	48	3,050	17,436	5,836
Non-NC surface	1,496	779	54,812	6,305	17,471	12,349
Other NC grinding	23	10	36	286	641	4,660
Other non-NC grinding	1,079	501	733	2,171	4,321	11,308
NC tool or cutter	3	2	6	62	93	131
Non-NC tool or cutter	311	2,926	2,576	2,683	827	1,943
Honing or lapping	486	1,433	1,793	3,341	10,617	14,993
Other	2,095	4,571	2,286	3,879	12,482	9,461
Planing machines	226	197	298	1,112	757	987
Shaping or slotting	1,359	785	1,150	3,195	4,497	4,964
Broaching machines	39	61	57	254	234	2,697
Gear cutting machines	521	516	271	1,310	2,474	4,805
Sawing or cutting-off	7,022	8,490	12,678	7,181	12,105	17,910
Other metal cutting	4,355	2,821	3,153	6,107	13,973	5,632
METAL FORMING TOTAL	8,720	10,330	18,625	75,666	107,156	143,300
Die casting machines	254	439	2,248	8,047	7,698	14,974
Forging or hammers	1,255	1,568	2,114	18,054	24,882	25,121
Bending or forming	983	1,600	1,560	8,394	10,105	20,039
of which NC	22	119	69	756	1,017	2,456
Shearing machines	1,970	2,535	7,129	6,588	16,290	10,230
of which NC	7	19	12	229	437	466
Punching or notching	888	316	399	4,727	3,963	4,987
of which NC	5	3	14	607	184	445
Presses	1,879	2,284	2,634	21,834	23,768	34,018
of which hydraulic	349	515	641	6,525	11,311	18,886
Draw benches	64	224	180	584	5,031	8,290
Thread rolling machines	104	180	245	460	1,083	2,631
Wire working machines	241	441	926	2,742	6,979	11,436
Riveting machines	249	286	280	1,274	877	831
Other metal forming	833	457	910	2,962	6,480	10,744

Source: Thailand Government Imports Statistics



(millions of U.S. dollars)

	Production*	Exports	Imports	Consumption	% Import Penetration	Exports as % of Prod.	Employment
1980	\$1,379.5	\$624.4	\$680.0	\$1,323.9	47.2%	49.3%	na
1981	880.1	432.6	570.6	742.1	58.3	64.8	32,600
1982	835.0	409.3	478.1	766.2	53.4	57.3	29,800
1983	628.0	294.1	319.1	603.0	48.8	50.8	25,900
1984	664.1	342.4	302.4	704.1	48.6	45.5	23,500
1985	785.6	394.3	344.7	835.2	47.2	43.9	23,800
1986	891.9	559.1	394.9	1,056.1	52.9	44.3	23,400
1987	1,055.5	529.7	501.0	1,084.2	48.9	47.5	23,200
1988	1,501.7	732.7	688.0	1,546.4	47.4	45.8	22,700
1989	1,483.9	851.5	653.6	1,681.8	50.6	44.0	22,100
1990(r)	1,679.4	932.9	873.6	1,738.7	53.7	52.0	20,700
1991(p)	1,288.1	798.4	727.5	1,359.0	58.7	56.4	18,300

Source: The Machine Tool Technologies Association (MTTA)

Note: * = includes estimates of production by small firms, and therefore differs from figures elsewhere in this section; r = revised; p = preliminary; na = not available

TAIWAN

Production

(millions of U.S. dollars)

	UNITS					VALUE				
	1987	1988	1989	1990	1991	1987	1988	1989	1990	1991
MACHINE TOOL TOTAL	na	na	1,928,373	1,031,262	991,954	\$577.8	\$770.0	\$1,016.5	\$943.7	\$962.6
METAL CUTTING TOTAL	na	na	1,908,613	1,009,522	967,416	482.5	599.3	791.0	682.8	681.3
EDM	na	na	3,484	2,817	2,518	16.2	38.3	47.0	37.8	37.3
of which NC	na	26	200	152	93	na	1.0	5.4	5.0	3.4
Machining centers	1,345	1,955	2,042	2,015	2,113	64.9	96.7	130.6	119.8	126.0
Special purpose machines	na	na	139	292	176	na	na	7.3	15.9	11.5
Lathes	na	na	23,963	17,296	18,762	99.2	159.7	229.4	202.2	224.6
of which NC	1,026	1,365	2,363	2,132	2,622	37.5	61.6	125.3	106.5	123.3
Drilling machines	na	na	723,060	476,641	668,278	88.9	82.0	82.7	77.4	78.4
of which NC	78	45	216	285	146	2.0	1.2	1.5	1.4	0.6
Boring machines	na	na	314	426	376	5.2	3.3	9.9	6.7	6.0
of which NC	57	19	30	8	13	2.3	0.2	4.4	1.1	1.4
Milling machines	na	na	19,292	16,246	15,252	68.3	85.3	118.2	95.8	83.2
of which NC	208	190	1,300	977	810	7.8	8.1	28.2	20.8	15.9
Bench grinders	na	na	1,029,762	441,393	206,318	28.2	33.0	34.5	16.4	7.2
Other grinding	na	na	12,158	8,123	6,665	36.7	49.2	55.9	58.6	49.3
of which NC	na	na	56	65	91	na	na	3.6	4.2	6.2
Sawing or cutting-off	na	na	91,278	41,985	44,770	24.4	33.4	39.7	26.2	27.0
Shape, slot, or planing	na	na	394	246	168	1.5	1.6	2.9	2.5	1.7
Gear cutting machines	na	na	68	170	110	0.2	0.1	0.5	1.2	0.8
Threading or tapping	na	na	786	592	656	2.1	2.4	4.2	3.5	8.3
Other metal cutting	na	na	1,873	1,280	1,254	46.7	14.0	28.0	18.7	20.0
METAL FORMING TOTAL	na	na	19,760	21,740	24,538	95.3	170.7	225.8	260.9	281.3
Presses and shearing	na	na	13,700	13,536	16,240	47.0	92.7	126.4	121.7	147.1
of which NC	na	na	51	36	56	na	na	3.4	1.4	2.3
Other metal forming	na	na	6,060	8,204	8,298	48.3	78.0	99.4	139.2	134.2

Source: Taiwan Association of Machinery Industry (TAMI)

Note: na = not available

UNITED KINGDOM

Production*

(millions of U.S. dollars)

	UNITS					VALUE				
	1987	1988	1989	1990	1991	1987	1988	1989	1990	1991
MACHINE TOOL TOTAL *	na	na	na	na	na	\$609.6	\$868.1	\$923.4	\$1,006.1	\$715.3
NC MACHINE TOOL TOTAL **	na	na	na	na	na	291.2	481.5	565.2	638.6	430.8
Physico-chemical machines	na	na	na	na	121	na	na	(a)	9.3	9.6
Horizontal machining centers	131	179	260	228	na	44.9	52.0	74.0	73.4	57.9
cube size < 400 mm	na	na	132	128	na	na	na	25.6	27.8	na
cube size > 400 mm	na	na	128	100	na	na	na	48.4	45.5	na
Vertical machining centers	756	1,028	1,303	1,542	839	73.6	123.8	104.9	135.3	74.0
x-axis <	na	na	597	553	237	na	na	39.7	37.3	14.2
x-axis > 650 mm	na	na	706	989	602	na	na	65.3	98.0	59.8
Other multi-function ***	830	911	na	na	na	44.0	43.5	na	na	na
Lathes	na	666	1,482	na	na	30.2	48.3	140.1	na	na
w/chuck < 210mm	145	na	939	na	na	10.7	na	75.3	na	na
w/chuck > 210mm	na	na	543	436	222	19.5	na	64.8	49.3	34.9
Drilling machines	na	na	na	na	na	(c)	(c)	3.4	6.8	na
Grinding machines	na	na	203	221	161	(c)	(c)	71.8	86.9	76.4
Milling machines	na	na	1,011	718	310	(c)	(c)	64.1	76.0	41.6
Punching or notching	na	na	na	188	163	na	na	na	15.7	14.0
Other NC machines	na	na	na	na	na	98.5	208.1	105.4	185.9	122.4
NON-NC METAL CUTTING TOTAL	na	na	na	na	na	226.3	272.6	230.5	227.9	145.4
Physico-chemical machines	na	na	na	na	na	15.6	19.4	18.7	13.4	(a)
Grinding machines	na	na	na	4,688	2,987	44.1	55.0	26.7	27.8	20.0
Cylindrical	208	na	na	na	na	16.1	17.8	na	na	na
Surface	513	512	na	na	na	11.8	15.5	na	na	na
Other	na	2,490	na	na	na	16.2	21.7	na	na	na
(continued)										

UNITED KINGDOM

Production*
(continued)

(millions of U.S. dollars)

	UNITS					VALUE				
	1987	1988	1989	1990	1991	1987	1988	1989	1990	1991
Boring, boring-milling	93	na	na	na	na	3.4	(a)	(b)	12.1	(b)
Drilling machines	710	582	na	1,014	na	3.8	6.9	(b)	6.1	(b)
Milling machines	na	2,378	na	714	625	22.0	24.9	24.9	17.7	10.8
Lathes	na	na	5,275	5,749	3,748	56.9	80.3	73.0	94.1	53.4
Transfer machines	na	na	na	na	na	62.3	61.3	56.4	39.3	36.8
Sawing or cutting-off	6,210	na	na	na	na	6.9	(a)	15.6	14.8	(a)
Other metal cutting	na	na	na	na	na	11.3	24.8	3.9	2.7	12.9
NON-NC METAL FORMING TOTAL	na	na	na	na	na	92.1	114.0	127.7	139.6	139.1
Bending or forming	na	na	125	246	212	na	na	43.1	46.4	28.8
Forging machines	na	na	na	31	(d)	3.3	3.4	(d)	1.4	(d)
Presses	na	na	660	563	599	na	na	37.4	44.3	49.5
Punching or shearing	na	na	na	na	(d)	(d)	15.0	25.9	29.6	(d)
Other metal forming	na	na	na	na	na	43.9	51.8	21.0	18.0	60.8
Metal cutting parts & accessories	-	-	-	-	-	138.2	171.2	177.1	192.9	143.0
Metal forming parts & accessories	-	-	-	-	-	36.2	38.5	47.6	49.6	55.7

Source: United Kingdom Department of Trade and Industry

Note: * = Data only cover firms with at least 35 employees; ** = does not include NC physico-chemical machines before 1989; *** = multi-function (drilling and milling and boring) with line motion or contouring control system with manual tool change or indexing turret; a = included in "other metal cutting"; b = combined total for 1989 was \$11.8 million; for 1991, \$11.5 million; c = included in "other NC machines"; d = included in "non-NC other metal forming"; na = not available

UNITED KINGDOM

Exports by Type of Machine*

(millions of U.S. dollars)

	UNITS				VALUE			
	1988	1989	1990	1991	1988	1989	1990	1991
MACHINE TOOL TOTAL	35,021	58,073	35,196	33,454	\$686.6	\$649.5	\$837.7	\$674.5
METAL CUTTING TOTAL	25,778	42,600	25,609	23,998	530.7	504.8	678.7	533.0
Physico-chemical	3,682	16,549	3,927	4,857	31.8	32.5	36.3	27.0
Wire cut EDM	17	79	62	23	1.7	3.4	4.1	1.6
Other EDM	270	439	291	165	5.7	6.0	3.8	7.0
Other	3,395	16,031	3,574	4,669	24.4	23.1	28.4	18.5
Machining centers	704	873	1,465	966	64.5	77.5	147.3	114.4
Horizontal	190	287	468	286	28.8	33.5	58.4	47.2
Other	514	586	997	680	35.7	44.0	88.9	67.1
Unit construction	66	151	72	106	3.5	3.2	4.2	4.9
Multi-station transfer	157	308	176	246	16.6	29.0	40.1	49.2
Lathes	4,149	4,594	5,475	4,293	164.4	134.4	174.3	114.6
NC	969	1,098	1,277	843	102.2	83.1	99.9	68.9
Horiz. < 4 tons	447	597	639	496	24.2	29.5	37.9	33.5
Horiz. 4-8 tons	385	367	544	261	47.6	36.3	53.3	26.2
Horiz. > 8 tons	87	69	33	31	20.2	10.7	4.5	4.7
Other	50	65	61	55	10.2	6.6	4.2	4.5
Non-NC	3,180	3,496	4,198	3,450	62.2	51.3	74.4	45.7
Center	2,445	2,560	3,565	2,475	29.5	25.1	39.9	29.7
Multi-tool, copy	100	168	240	211	2.0	2.1	2.8	2.4
Automatic	184	210	152	47	18.0	13.1	19.6	3.5
Other	451	558	241	717	12.7	11.0	12.1	10.1
Way type unit heads	44	82	198	270	4.5	7.8	3.9	4.6
Drilling machines	2,445	2,386	2,603	3,558	17.6	8.1	34.7	56.0
of which NC	70	119	427	72	2.7	0.8	24.9	4.8
Boring-milling	257	274	452	392	20.4	23.5	35.4	19.2
of which NC	45	94	98	65	11.6	18.9	25.2	12.7
Boring machines	757	1,442	190	453	9.7	7.7	6.0	7.1
of which NC	12	36	19	6	2.0	0.9	1.6	0.5
Milling machines	1,952	2,056	1,326	1,223	47.8	36.2	28.9	25.9
NC knee type	191	185	197	106	10.9	6.7	7.6	4.3
Non-NC knee type	1,029	997	497	515	15.3	12.1	6.7	6.1
Other NC	137	229	233	170	10.1	9.3	9.4	9.6
Other non-NC	595	645	399	432	11.5	8.1	5.2	5.9
Threading or tapping	237	534	356	307	6.7	7.5	5.1	5.9

(continued)

UNITED KINGDOM

Exports by Type of Machine*
(continued)

(millions of U.S. dollars)

	UNITS				VALUE			
	1988	1989	1990	1991	1988	1989	1990	1991
Grinding machines	3,977	3,700	3,850	3,199	87.6	75.2	97.7	88.3
NC	164	222	175	184	32.7	21.7	29.0	33.9
Surface	41	96	83	78	3.1	5.6	12.4	5.5
Other	123	126	92	106	29.6	16.1	16.6	28.4
Non-NC	3,566	3,266	3,453	2,662	49.0	49.6	64.6	46.9
Surface	738	916	1,131	708	13.8	15.0	17.8	11.0
Cylindrical	389	633	460	363	14.4	22.9	30.1	15.6
Thread or gear	41	64	31	(b)	5.7	2.4	3.2	(b)
Other	2,398	1,673	1,831	1,591	15.1	9.3	13.5	20.3
Honing or lapping	247	212	222	353	5.0	3.0	4.1	7.6
Shaping or slotting	78	144	139	295	2.4	1.5	2.4	4.0
Broaching machines	25	50	51	58	0.3	9.2	16.0	12.2
Gear cutting machines	626	498	196	275	13.6	8.1	7.2	9.9
NC	19	4	6	3	2.5	1.6	0.7	0.2
Non-NC	607	494	190	272	11.1	6.5	6.5	9.7
Sawing or cut-off	2,566	2,550	1,561	1,174	11.8	7.7	8.9	5.3
Used cutting machines	3,030	3,438	2,477	2,969	24.1	28.7	19.2	17.6
Other metal cutting	1,026	2,971	1,095	1,391	3.5	7.0	10.8	8.4
METAL FORMING TOTAL	9,243	15,473	9,587	9,456	155.9	144.7	159.0	141.5
Forging or die-stamping	280	975	699	558	13.0	23.4	14.9	14.8
of which NC	3	13	39	542	0.3	0.5	3.9	13.6
Bending or forming	2,333	4,065	2,170	1,943	52.4	53.2	58.2	50.9
of which NC	242	312	286	144	12.1	8.5	13.9	16.5
Shearing machines	748	1,217	1,762	793	15.8	10.3	21.3	7.8
of which NC	27	66	27	12	2.0	0.7	0.6	1.0
Punching or notching	622	919	630	733	10.7	9.3	17.6	10.4
of which NC	79	145	91	54	5.2	4.2	6.8	3.9
Presses	1,148	2,653	1,882	1,540	27.5	21.6	24.2	29.1
NC	28	14	9	33	6.3	6.6	1.0	10.5
Non-NC hydraulic	224	328	305	441	4.8	5.9	5.4	8.4
Non-NC other	896	2,311	1,568	1,066	16.4	9.1	17.8	10.2
Draw benches	172	164	301	195	9.3	6.2	5.9	5.6
Wire working machines	1,002	1,057	769	1,274	12.3	5.9	7.6	11.1
Other metal forming	2,938	4,423	1,374	2,420	14.9	14.8	9.4	11.9

Source: The Machine Tool Technologies Association (MTTA)

Note: * = This chart excludes some items which were probably misclassified in U.K. export data. Totals in this chart therefore differ from totals in other charts in this section. b = included in "other non-NC grinding"

UNITED KINGDOM

Imports by Type of Machine*

(millions of U.S. dollars)

	UNITS				VALUE			
	1988	1989	1990	1991	1988	1989	1990	1991
MACHINE TOOL TOTAL	50,622	62,232	35,230	26,427	\$723.8	\$844.0	\$889.1	\$754.2
METAL CUTTING TOTAL	29,622	42,280	19,663	16,610	496.0	603.2	637.9	569.5
Physico-chemical	1,547	2,652	1,795	1,668	42.0	37.1	51.6	60.6
Wire cut EDM	213	180	218	94	20.2	12.5	15.0	6.9
Other EDM	272	264	407	233	5.3	5.3	10.0	16.0
Other	1,062	2,208	1,170	1,341	16.5	19.3	26.6	37.7
Machining centers	723	774	1,268	742	70.9	99.0	107.2	71.3
Horizontal	169	359	422	231	31.2	55.6	50.8	33.0
Other	554	415	846	511	39.7	43.4	56.5	38.3
Unit construction	23	40	66	52	6.8	6.2	7.5	3.8
Multi-station transfer	76	368	478	229	14.1	63.5	107.3	67.6
Lathes	2,414	2,772	1,972	1,456	140.7	154.2	144.6	132.6
NC	1,195	1,419	1,286	965	111.9	132.0	124.2	110.5
Horiz. < 4 tons	549	619	516	508	36.2	43.1	31.7	29.3
Horiz. 4-8 tons	388	473	502	248	37.4	47.2	49.1	25.3
Horiz. > 8 tons	133	142	141	111	25.9	24.9	30.6	29.4
Other	125	185	127	98	12.4	16.8	12.8	26.5
Non-NC	1,219	1,353	686	491	28.8	22.2	20.4	22.0
Center	399	642	356	141	5.9	5.8	6.1	2.9
Multi-tool, copy	92	197	70	106	2.8	1.9	1.3	2.4
Automatic	189	219	49	5	8.2	4.1	3.5	0.2
Other	539	295	211	239	11.9	10.4	9.5	16.5
Way type unit heads	12	17	40	43	1.2	1.8	2.0	1.2
Drilling machines	1,933	3,675	1,955	1,298	14.2	15.6	17.5	35.1
of which NC	106	97	95	68	7.8	7.8	9.6	5.6
Boring-milling	380	225	272	120	16.8	18.3	18.9	11.3
of which NC	94	78	117	55	10.9	12.4	11.1	9.6
Boring machines	415	486	88	63	3.7	8.9	3.2	1.5
of which NC	9	37	6	1	0.7	6.1	0.6	(a)
Milling machines	2,890	3,558	1,307	986	47.2	44.9	33.3	25.0
NC knee type	10	9	10	11	1.5	1.3	0.7	0.4
Non-NC knee type	504	469	391	59	4.4	4.3	3.3	1.2
Other NC	290	276	265	187	25.2	17.7	21.3	15.1
Other non-NC	2,086	2,804	641	729	16.1	21.6	8.0	8.3
Threading or tapping	1,119	1,546	549	429	6.4	5.9	5.3	4.1

(continued)

UNITED KINGDOM

Imports by Type of Machine*
(continued)

(millions of U.S. dollars)

	UNITS				VALUE			
	1988	1989	1990	1991	1988	1989	1990	1991
Grinding machines	2,863	4,915	2,185	2,052	65.0	65.8	72.9	115.2
NC	164	240	253	447	25.8	38.8	38.3	78.4
Surface	34	42	80	95	3.6	5.6	7.3	14.7
Other	130	198	173	352	22.2	33.2	31.0	63.7
Non-NC	2,639	4,564	1,837	1,529	36.1	22.2	31.5	33.9
Surface	588	780	339	201	8.8	7.0	8.0	4.3
Cylindrical	214	370	218	135	10.2	8.6	9.0	3.2
Thread or gear	32	12	15	(b)	1.6	1.0	1.2	(b)
Other	1,805	3,402	1,265	1,193	15.5	5.6	13.3	26.4
Honing or lapping	60	111	95	76	3.1	4.8	3.1	2.9
Shaping or slotting	43	107	177	14	1.2	2.5	1.1	0.5
Broaching machines	12	27	154	21	1.4	0.8	10.0	1.5
Gear cutting machines	387	395	217	271	16.2	14.2	12.6	30.7
NC for cyl. gears	52	5	7		3.4	2.0	3.7	
NC for other gears	3	2	-	21	1.4	0.7	-	6.2
NC gear finishing	13	5	2		4.6	0.7	1.4	
Non-NC gear machines	319	383	208	250	6.8	10.8	7.5	24.5
Sawing or cutting-off	11,140	12,998	3,708	2,516	25.1	24.0	22.0	18.1
Used cutting machines	781	1,122	762	1,142	13.5	14.9	8.1	12.5
Other metal cutting	2,864	6,603	2,882	3,953	9.9	14.9	12.8	8.0
METAL FORMING TOTAL	21,000	19,952	15,567	9,817	227.8	240.8	251.1	184.8
Forging or stamping	273	326	628	378	10.0	13.5	21.4	38.9
of which NC	11	5	9	321	2.6	1.0	1.6	8.1
Bending or forming	3,601	4,499	2,007	1,545	45.0	43.8	39.3	40.6
of which NC	222	408	344	137	13.7	15.7	14.2	16.5
Shearing machines	3,843	2,807	994	269	30.8	56.0	32.9	16.2
of which NC	94	55	245	82	6.0	2.1	12.0	5.2
Punching or notching	1,309	948	1,096	337	38.2	37.1	44.3	18.9
of which NC	190	230	430	95	26.3	29.7	31.0	12.6
Presses	2,323	4,885	4,585	4,106	59.9	52.8	81.1	44.1
NC	43	41	41	65	30.7	16.9	34.1	9.5
Non-NC hydraulic	657	1,292	510	353	11.3	16.4	13.4	10.4
Non-NC other	1,623	3,552	4,034	3,688	17.9	19.5	33.6	24.2
Draw benches	129	244	119	350	5.8	7.5	2.2	6.3
Thread rolling machines	47	31	19	(c)	0.9	0.7	0.5	(c)
Wire working machines	447	646	447	446	7.7	12.2	11.3	7.3
Other metal forming	9,075	5,597	5,691	2,386	30.4	17.8	18.6	12.4

Source: The Machine Tool Technologies Association (MTTA)

Note: * = This chart excludes some items which were probably misclassified in U.K. import data. Totals in this chart therefore differ from totals in other charts in this section. a = less than \$50,000; b = included in "other grinding machines"; c = included in "other metal forming"

UNITED KINGDOM

Exports by Destination

(millions of U.S. dollars)

	1987	1988	1989	1990	1991
TOTAL EXPORTS	\$501.0	\$688.0	\$653.6	\$873.6	\$727.5
Germany	52.7	72.0	76.9	133.4	121.4
United States	97.3	110.8	106.7	136.9	92.3
Belgium-Luxembourg	21.1	32.8	57.9	85.7	64.2
France	34.5	55.6	43.9	71.2	62.6
Netherlands	13.4	12.8	11.7	19.6	34.0
Italy	24.7	36.9	34.6	44.9	29.0
Spain	29.4	22.4	23.9	21.5	20.9
Ireland	11.8	15.3	21.8	22.5	19.4
Switzerland	11.1	14.1	14.3	18.8	17.7
India	9.6	9.9	9.0	15.5	16.6
Iran	5.4	6.5	2.4	5.1	14.6
Australia	15.0	16.6	20.3	12.2	13.6
Japan	3.7	7.8	10.4	11.3	13.3
USSR	14.8	14.6	10.8	32.6	12.3
China	10.2	18.0	15.6	5.8	12.3
Singapore	2.7	5.8	5.3	11.5	11.9
Sweden	18.4	13.8	16.6	28.6	11.2
Canada	23.7	14.8	11.8	12.1	10.1
South Africa	8.4	17.3	14.9	16.5	7.9
Egypt	5.3	10.3	13.8	3.9	5.1
Iraq	4.7	56.1	20.3	8.5	-
Other Countries	83.1	123.8	110.6	155.5	137.1

Source: The Machine Tool Technologies Association (MTTA)

UNITED KINGDOM

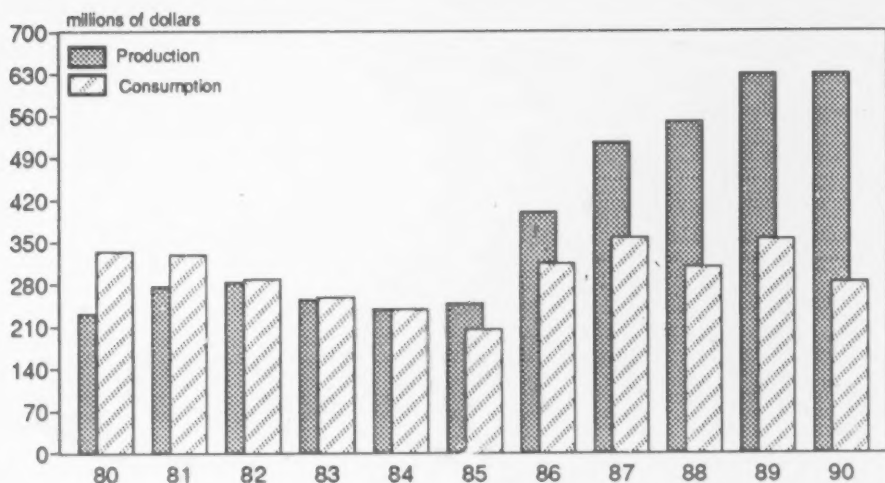
Imports by Country of Origin

(millions of U.S. dollars)

	1987	1988	1989	1990	1991
TOTAL IMPORTS	\$529.7	\$732.7	\$851.5	\$932.9	\$798.4
Germany	182.2	185.6	187.9	239.9	263.8
Japan	115.1	182.8	206.8	213.4	207.0
United States	43.6	85.3	147.9	131.2	71.4
Switzerland	36.8	50.1	39.8	55.3	67.4
Italy	25.7	38.1	46.9	50.0	37.1
Taiwan	21.4	31.0	41.3	33.9	23.2
France	13.3	27.1	26.2	32.2	19.2
Belgium-Luxembourg	13.4	14.3	11.6	18.6	15.9
Sweden	16.6	25.3	21.2	20.4	13.7
Netherlands	6.4	15.3	15.6	11.6	10.0
Austria	10.7	9.8	19.8	6.2	10.0
Spain	12.0	15.1	11.8	12.8	7.7
Canada	0.9	1.0	18.0	44.2	3.4
Denmark	6.4	5.9	5.2	5.1	3.3
Other Countries	25.2	46.0	51.3	58.1	45.3

Source: The Machine Tool Technologies Association (MTTA)

F



(millions of U.S. dollars)

	Production	Imports	Exports	Consumption	% Import Penetration	Exports as % of Prod.
1979	\$189.2	\$192.8	\$54.3	\$327.7	58.8%	28.7%
1980	231.8	186.7	83.8	335.2	55.7	35.9
1981	276.7	131.0	77.8	329.9	39.7	28.1
1982	284.5	140.3	136.4	288.4	48.7	47.9
1983	255.0	137.9	134.6	258.3	53.3	52.8
1984	239.2	125.4	125.2	239.0	52.5	52.5
1985	247.9	99.9	142.7	205.1	48.7	57.6
1986	399.4	143.3	219.4	314.3	45.6	56.2
1987	515.0	145.0	303.4	356.6	40.7	58.9
1988	550.0	152.0	393.6	308.4	49.3	71.6
1989	630.0	125.3	401.2	354.1	35.5	63.7
1990	630.0	118.0	464.6	283.4	41.6	73.7

Source: Yugoslav Machine Tool Builders' Association

Contents

U.S. Economic Statistics

Section G

Section Note: In December of 1991, the Bureau of Economic Analysis released a comprehensive revision of the National Income and Product Accounts (NIPAs). The revision includes the use of Gross Domestic Product (GDP) rather than Gross National Product (GNP) as the primary measure of U.S. output. In addition, the base period for the calculation of constant-dollar estimates is shifted from 1982 to 1987.

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ECONOMIC STATISTICS

Business Cycle Reference Dates

Expansion	Duration in Months	Recession	Duration in Months
Oct. 1945 - Nov. 1948	37	Nov. 1948 - Oct. 1949	11
Oct. 1949 - July 1953	45 (a)	July 1953 - May 1954	10
May 1954 - Aug. 1957	39	Aug. 1957 - Apr. 1958	8
Apr. 1958 - Apr. 1960	24	Apr. 1960 - Feb. 1961	10
Feb. 1961 - Dec. 1969	106 (a)	Dec. 1969 - Nov. 1970	11
Nov. 1970 - Nov. 1973	36	Nov. 1973 - Mar. 1975	16
Mar. 1975 - Jan. 1980	58	Jan. 1980 - July 1980	6
July 1980 - July 1981	12	July 1981 - Nov. 1982	16
Nov. 1982 - July 1990	92	July 1990 -	na

Source: National Bureau of Economic Research, Inc.

Note: (a) - Wartime expansion

The historical business cycle turning dates, above, are designated by the National Bureau of Economic Research, Inc. (NBER). They mark the approximate dates when, according to the NBER, aggregate economic activity reached its cyclical high (peak) or low (trough).

ECONOMIC STATISTICS

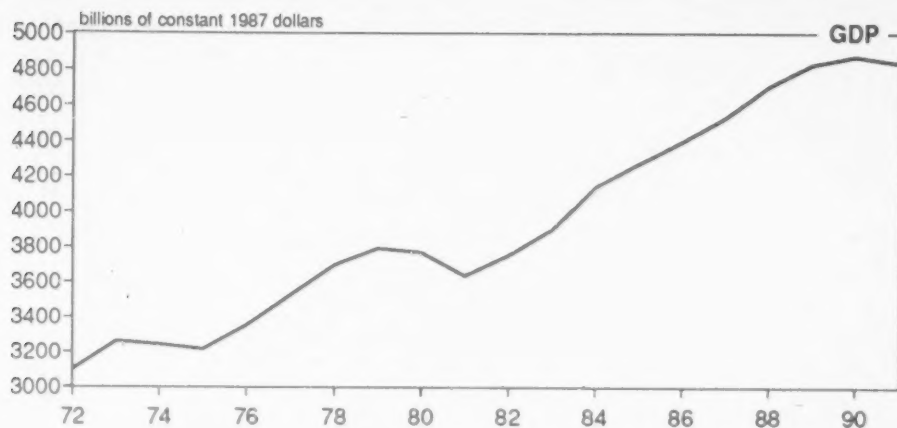
Selected Leading Business Cycle Indicators

(billions of 1982 dollars)

Year	Index of Leading Economic Indicators (1982 = 100)	Average Workweek Manufacturing (Hours)	Contracts and Orders for Plant and Equipment	New Orders Consumer Goods and Materials	Change in Mfrs Unfilled Orders, Durable Goods
1971	83.3	39.9	\$258.15	\$783.76	-1.12
1972	92.3	40.5	283.17	881.36	1.29
1973	97.2	40.7	351.06	979.67	5.13
1974	89.0	40.0	350.99	907.00	1.92
1975	84.5	39.5	265.85	778.64	-5.12
1976	96.2	40.1	297.35	889.93	-0.85
1977	101.0	40.3	327.41	986.07	0.90
1978	104.6	40.4	380.52	1,042.19	3.74
1979	103.6	40.2	407.10	1,019.17	2.72
1980	99.2	39.7	361.33	909.28	-1.06
1981	101.2	39.8	351.96	906.61	-1.09
1982	100.0	38.9	309.54	837.01	-2.34
1983	116.2	40.1	317.13	933.73	1.13
1984	121.8	40.7	379.83	1,016.11	2.31
1985	124.0	40.5	410.23	1,022.50	0.03
1986	132.1	40.7	413.40	1,043.05	-0.08
1987	139.6	41.0	474.17	1,096.43	1.37
1988	142.8	41.1	540.57	1,118.85	1.83
1989	144.9	41.0	591.18	1,127.06	2.01
1990	143.9	40.8	540.35	1,106.31	0.76
1991	143.6	40.7	523.60	1,048.27	-1.31

Source: U.S. Department of Commerce, Bureau of Economic Analysis

ECONOMIC STATISTICS

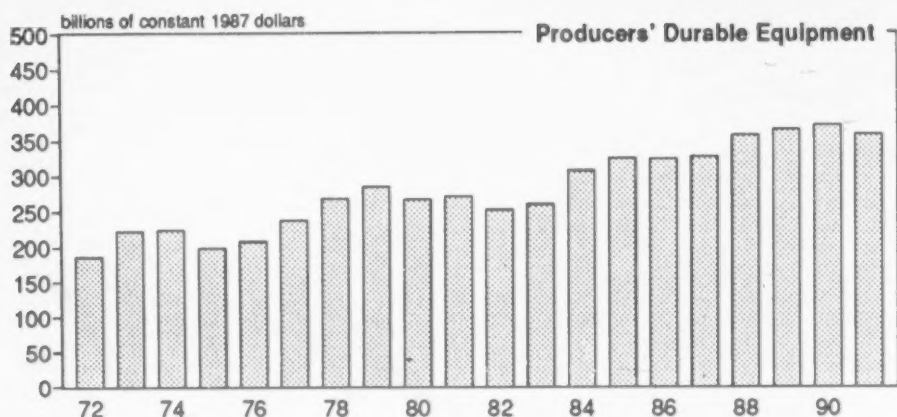
Gross Domestic Product
and Components

Year	Gross Domestic Product	Personal Consumption Expenditures	Gross Private Domestic Investment	Net Exports of Goods and Services	Government Purchases of Goods and Services
Current Dollars (billions)					
1985	\$4,038.7	\$2,667.4	\$714.5	\$-115.6	\$772.3
1986	4,268.6	2,850.6	717.6	-132.5	833.0
1987	4,539.9	3,052.2	749.3	-143.1	881.5
1988	4,900.4	3,296.1	793.6	-108.0	918.7
1989	5,244.0	3,517.9	837.6	-82.9	971.4
1990	5,513.8	3,742.6	802.6	-74.4	1,042.9
1991	5,672.6	3,889.1	726.7	-30.7	1,087.5
Constant 1987 Dollars (billions)					
1972	\$3,107.1	\$1,978.4	\$532.2	\$-56.5	\$653.0
1973	3,268.6	2,066.7	591.7	-34.1	644.2
1974	3,248.1	2,053.8	543.0	-4.1	655.4
1975	3,221.7	2,097.5	437.6	23.1	663.5
1976	3,380.8	2,207.3	520.6	-6.4	659.2
1977	3,533.3	2,296.6	600.4	-27.8	664.1
1978	3,703.5	2,391.8	664.6	-29.9	677.0
1979	3,796.8	2,448.4	669.7	-10.6	689.3
1980	3,776.3	2,447.1	594.4	30.7	704.2
1981	3,843.1	2,476.9	631.1	22.0	713.2
1982	3,760.3	2,503.7	540.5	-7.4	723.6
1983	3,906.6	2,619.4	599.5	-56.1	743.8
1984	4,148.5	2,746.1	757.5	-122.0	766.9
1985	4,279.8	2,865.8	745.9	-145.3	813.4
1986	4,404.5	2,969.1	735.1	-155.1	855.4
1987	4,540.0	3,052.2	749.3	-143.0	881.5
1988	4,718.6	3,162.4	773.4	-104.0	886.8
1989	4,836.9	3,223.1	789.2	-75.7	900.4
1990(r)	4,884.9	3,262.6	744.5	-51.3	929.1
1991(p)	4,848.8	3,259.0	673.7	-20.9	937.1

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Source: U.S. Department of Commerce, Bureau of Economic Analysis, NIPA Tables 1.1 and 1.2

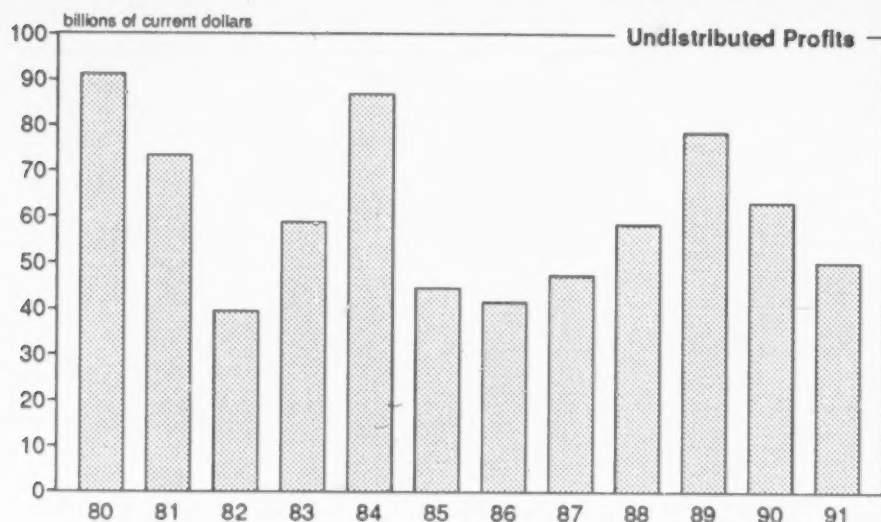
ECONOMIC STATISTICS

Gross Domestic Product
and Private Investment

Gross Private Fixed Nonresidential Domestic Investment					
Year	Gross Domestic Product	Total		Producers' Durable Equipment	
		Billions \$	% of GDP	Billions \$	% of GDP
Current Dollars (billions)					
1986	\$4,268.6	\$492.4	11.5%	\$318.4	7.5%
1987	4,539.9	497.8	11.0	326.5	7.2
1988	4,900.4	545.4	11.1	363.4	7.4
1989	5,244.0	570.7	10.9	377.6	7.2
1990	5,513.8	587.0	10.6	388.3	7.0
1991	5,672.6	550.1	9.7	375.5	6.6
Constant 1987 Dollars (billions)					
1972	\$3,107.1	\$311.6	10.0%	\$186.8	6.0%
1973	3,268.6	357.4	10.9	222.4	6.8
1974	3,248.1	356.5	11.0	224.2	6.9
1975	3,221.7	316.8	9.8	198.8	6.2
1976	3,380.8	328.7	9.7	208.2	6.2
1977	3,533.3	364.3	10.3	238.2	6.7
1978	3,703.5	412.9	11.1	268.8	7.3
1979	3,796.8	448.8	11.8	285.5	7.5
1980	3,776.3	437.8	11.6	267.6	7.1
1981	3,843.1	455.0	11.8	272.0	7.1
1982	3,760.3	433.9	11.5	252.6	6.7
1983	3,906.6	420.8	10.8	260.5	6.7
1984	4,148.5	490.2	11.8	307.4	7.4
1985	4,279.8	521.8	12.2	324.4	7.6
1986	4,404.5	500.3	11.4	323.7	7.3
1987	4,540.0	497.8	11.0	326.5	7.2
1988	4,718.6	530.8	11.2	356.8	7.6
1989	4,836.9	542.4	11.2	365.0	7.5
1990 (r)	4,884.9	548.8	11.2	370.8	7.6
1991(p)	4,848.8	512.4	10.6	358.3	7.4

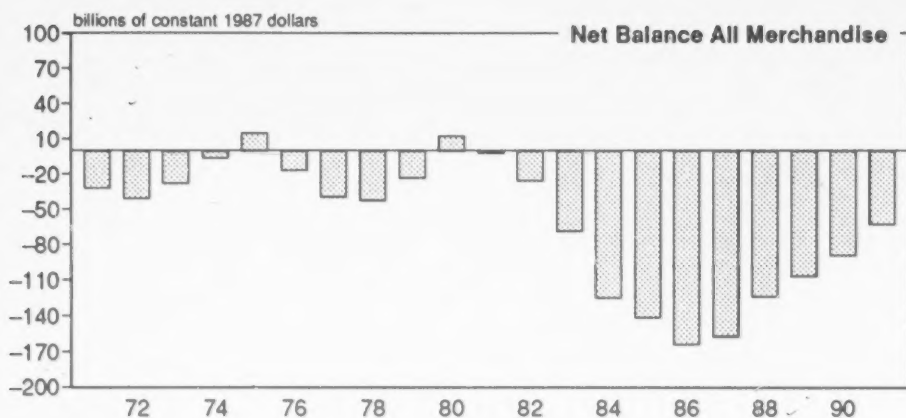
Sources: U.S. Department of Commerce, Bureau of Economic Analysis, NIPA Tables 1.1 and 1.2

Note: Gross private fixed nonresidential domestic investment includes capital expenditures by the domestic business sector for (1) new and replacement construction (e.g., buildings, stores and warehouses) and (2) producers' durable equipment. Expenditures for producers' durable equipment include the new and replacement purchases of automobiles, trucks, various types of machinery, and other equipment used by the private sector in the production of goods and services.



Year	Corporate Profits Before Taxes	Profits Tax Liability	Profits After Tax	Net Dividend Payments	Undistributed Profits
Current Dollars (billions)					
1980	\$234.6	\$84.8	\$149.8	\$58.6	\$91.2
1981	221.2	81.1	140.0	66.5	73.5
1982	169.5	63.1	106.5	66.9	39.6
1983	207.6	77.2	130.4	71.5	58.9
1984	240.0	93.9	146.1	79.0	67.0
1985	224.3	96.4	127.8	83.3	44.6
1986	236.4	106.6	129.8	88.2	41.6
1987	276.7	133.8	142.9	95.5	47.4
1988	328.6	139.7	168.9	110.4	58.5
1989	307.7	135.1	172.6	123.5	49.1
1990(r)	332.3	135.3	197.0	133.7	63.3
1991(p)	312.4	124.5	187.9	137.8	50.2

Source: U.S. Department of Commerce, Bureau of Economic Analysis, NIPA Table 1.14

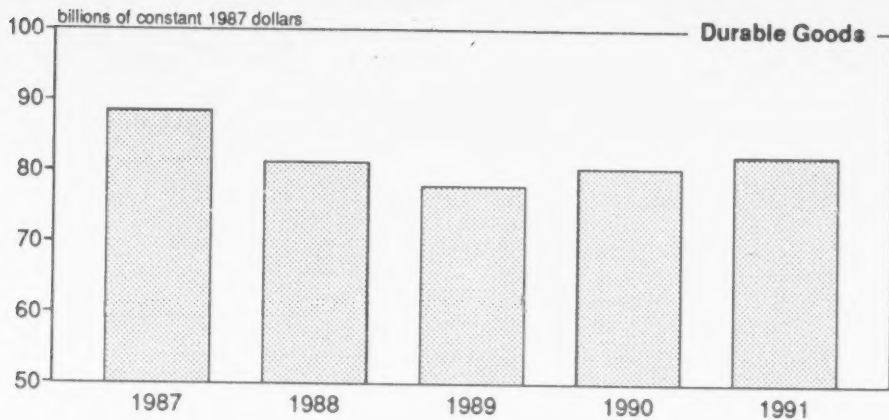


Year	All Merchandise			Capital Goods, except Autos		
	Exports	Imports	Net Balance	Exports	Imports	Net Balance
Current Dollars (billions)						
1986	\$226.2	\$370.0	\$-143.8	\$82.8	\$72.0	\$10.8
1987	257.7	414.8	-157.1	92.7	85.1	7.6
1988	325.8	452.1	-126.3	119.1	102.2	16.9
1989	371.4	484.6	-113.2	139.6	112.5	27.1
1990(r)	398.2	507.4	-109.2	153.3	116.0	37.3
1991(p)	427.2	500.5	-73.3	166.9	121.6	45.3
Constant 1987 Dollars (billions)						
1971	\$124.1	\$156.1	\$-32.0	\$40.1	\$10.1	\$30.0
1972	136.5	177.5	-41.0	43.5	12.9	30.6
1973	166.9	194.7	-27.8	54.7	15.8	38.9
1974	183.4	189.3	-5.9	66.9	16.6	50.3
1975	178.5	163.3	15.2	67.5	15.6	51.9
1976	183.9	200.4	-16.5	65.3	18.5	46.8
1977	183.9	223.2	-39.3	62.4	19.6	42.8
1978	203.0	245.2	-42.2	69.8	25.0	44.8
1979	225.7	248.7	-23.0	82.1	30.5	51.6
1980	248.2	235.6	12.6	92.9	35.8	57.1
1981	244.0	246.1	-2.1	91.8	41.8	50.0
1982	217.7	243.1	-25.4	77.8	42.1	35.7
1983	208.3	276.5	-68.2	71.6	46.8	24.8
1984	221.3	346.1	-124.8	75.2	67.2	8.0
1985	224.8	366.5	-141.7	77.5	70.7	6.8
1986	234.3	398.0	-163.7	82.1	76.0	6.1
1987	257.7	414.8	-157.1	92.7	85.1	7.6
1988	307.4	431.3	-123.9	118.4	97.3	21.1
1989	343.8	450.4	-106.6	136.8	109.6	27.2
1990(r)	369.4	458.5	-89.1	149.8	114.0	35.8
1991(p)	397.4	459.8	-62.4	164.6	122.5	42.1

Source: U.S. Department of Commerce, Bureau of Economic Analysis, NIPA Tables 4.3 and 4.4

ECONOMIC STATISTICS

National Defense Purchases of Durable Goods



Category	1987	1988	1989	1990	1991
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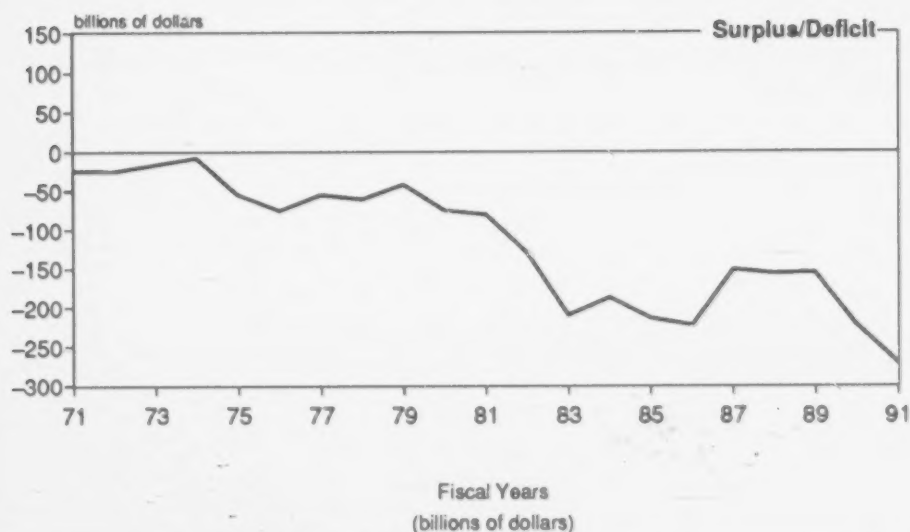
Current Dollars (billions)

National Defense Purchases	\$294.6	\$297.2	\$301.1	\$313.4	\$323.5
Durable Goods	89.6	83.0	80.9	85.9	89.5
Military Equipment	77.5	72.4	71.6	79.3	77.7
Aircraft	33.9	29.2	26.6	30.6	26.7
Missiles	12.6	12.1	13.0	15.4	16.6
Ships	8.5	8.4	9.9	12.5	12.1
Vehicles	4.8	4.2	3.6	4.7	4.3
Electronic Equip.	5.8	6.0	6.4	7.3	6.6
Other	11.7	12.4	12.2	8.8	11.4
Other Durable Goods	12.2	10.7	9.3	6.6	11.8

Constant 1987 Dollars (billions)

National Defense Purchases	\$292.1	\$287.0	\$280.7	\$281.3	\$281.4
Durable Goods	88.5	81.3	77.9	80.5	82.3
Military Equipment	80.6	74.8	71.3	74.8	72.2
Aircraft	35.6	32.0	27.8	28.4	24.9
Missiles	13.5	12.9	13.4	15.8	16.6
Ships	9.8	9.4	10.3	11.4	10.4
Vehicles	7.2	6.0	4.8	4.4	4.0
Electronic Equip.	6.8	6.8	7.1	6.9	6.2
Other	7.7	7.8	8.0	7.9	10.0
Other Durable Goods	7.9	6.5	6.5	5.8	10.1

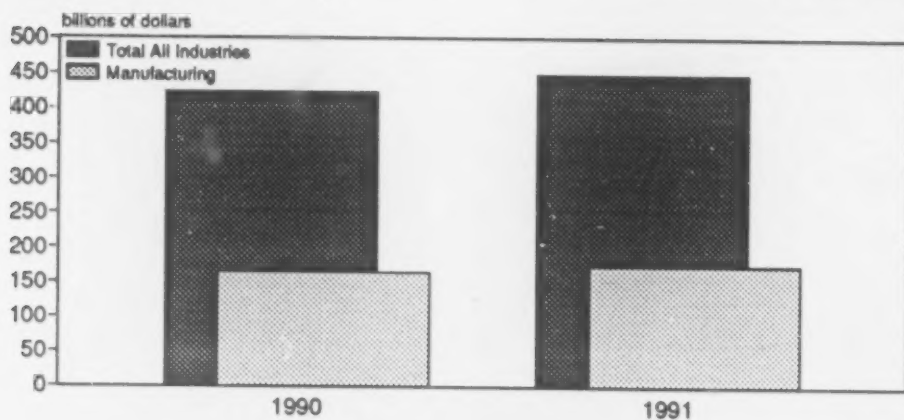
Source: U. S. Department of Commerce, Bureau of Economic Analysis, NIPA Tables 3.9 and 3.10



Year	Receipts	Outlay	Surplus or Deficit (-)
1971	\$ 187.1	\$ 210.2	\$ -23.0
1972	207.3	230.7	-23.4
1973	230.8	245.7	-14.9
1974	263.2	269.4	-6.1
1975	279.1	332.3	-53.2
1976	298.1	371.8	-73.7
Tr. Qtr.	81.2	96.0	-14.7
1977	355.6	409.2	-53.6
1978	399.6	458.7	-59.2
1979	463.3	503.5	-40.2
1980	517.1	590.9	-73.8
1981	599.3	678.2	-78.9
1982	617.8	745.7	-127.9
1983	600.6	808.3	-207.8
1984	666.5	851.8	-185.3
1985	734.1	946.3	-212.3
1986	769.1	990.3	-221.2
1987	854.1	1,003.8	-149.7
1988	909.0	1,064.0	-155.1
1989	990.7	1,144.1	-153.4
1990(r)	1,031.3	1,251.8	-220.5
1991(p)	1,054.3	1,323.0	-268.7

Source: "Economic Report of the President," February 1992

Note: Tr. Qtr. - Transition Quarter: Beginning with the 1977 Federal Budget, the fiscal year runs from October 1 through September 30. To facilitate the conversion, a three-month transition period was provided between fiscal years 1976 and 1977.

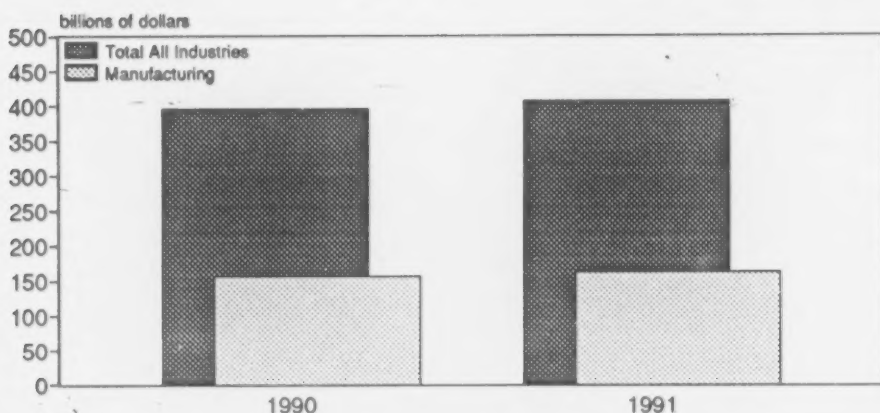


On a Historical-Cost Basis at Year End
(millions of U.S. dollars)

	Total All Industries		Manufacturing	
	1990(r)	1991(p)	1990(r)	1991(p)
All countries	\$424,086	\$450,196	\$164,466	\$175,413
Canada	67,033	68,510	31,790	32,360
Europe	211,194	224,554	83,333	89,090
European Communities (12)	177,642	188,710	80,508	85,664
Belgium	9,050	8,838	4,129	4,002
France	18,874	20,495	11,338	11,952
Germany	27,259	32,942	16,275	20,086
Italy	13,117	13,825	8,442	8,730
Netherlands	22,658	24,711	6,801	7,715
Spain	7,704	7,712	5,124	5,436
United Kingdom	68,224	68,261	21,893	20,851
Other EC	10,753	11,924	6,504	6,893
Other Europe	33,552	35,845	2,825	3,426
Japan	20,997	22,918	9,910	10,437
Australia, New Zealand, and South Africa	18,932	19,451	6,534	7,195
Australia	14,846	15,627	5,764	6,141
New Zealand	3,131	2,809	298	558
South Africa	956	1,015	472	496
Latin America and Other Western Hemisphere	71,593	77,342	23,733	25,687
South America	23,760	25,998	15,026	15,441
Brazil	14,918	15,222	11,021	11,002
Other South America	8,842	10,776	4,005	4,439
Central America	17,719	23,408	7,913	9,302
Mexico	9,398	11,570	7,196	8,493
Other Central America	8,321	11,838	717	809
Other Western Hemisphere	30,113	27,935	793	945
Other Africa	3,905	4,371	327	347
Middle East	3,973	4,715	907	1,192
Other Asia and Pacific	22,890	25,180	7,933	9,104

Source: U.S. Department of Commerce, "Survey of Current Business" (June 1992)

Note: Historical cost reflects book value and does not necessarily reflect current market value of investments.



On a Historical-Cost Basis at Year End

(millions of U.S. dollars)

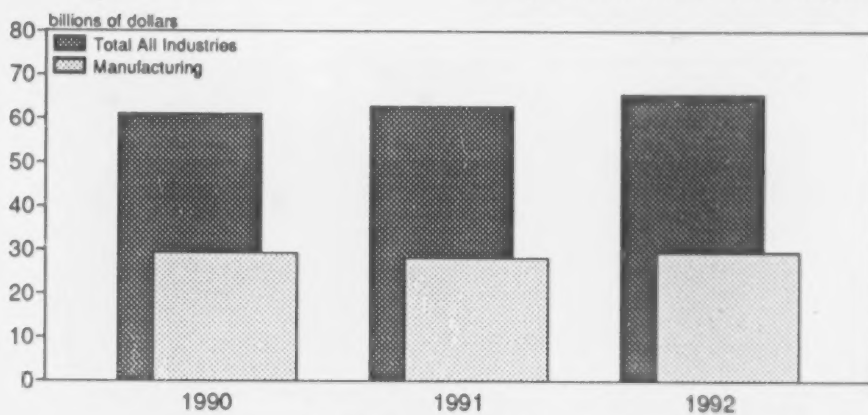
	Total All Industries		Manufacturing	
	1990 (r)	1991 (p)	1990 (r)	1991 (p)
World	\$396,702	\$407,577	\$157,431	\$162,853
Canada	30,037	30,002	9,652	9,662
Europe	250,973	258,127	121,292	126,809
European Communities (12)	224,447	232,007	104,068	110,198
France	18,665	22,740	13,669	14,821
Germany	28,309	28,171	15,695	16,546
Netherlands	63,938	63,848	24,717	24,137
United Kingdom	102,790	106,064	47,304	50,120
Other Europe				
Sweden	5,467	5,597	5,238	5,343
Switzerland	17,745	17,594	10,393	9,781
Latin America and				
Other Western Hemisphere	19,616	17,673	5,423	3,664
South and Central America	6,020	6,466	573	527
Other Western Hemisphere	13,596	11,208	4,850	3,137
Africa	512	309	D	D
Middle East	4,423	4,798	D	D
Asia and Pacific	91,141	96,668	20,811	22,412
Australia	6,539	6,626	2,106	2,055
Japan	81,775	86,658	17,153	18,657

Source: U.S. Department of Commerce, "Survey of Current Business" (June 1992)

Note: Historical cost reflects book value and does not necessarily reflect current market value of investments.

ECONOMIC STATISTICS

Capital Expenditures by Majority-Owned Foreign Affiliates of U.S. Companies



(millions of U.S. dollars)

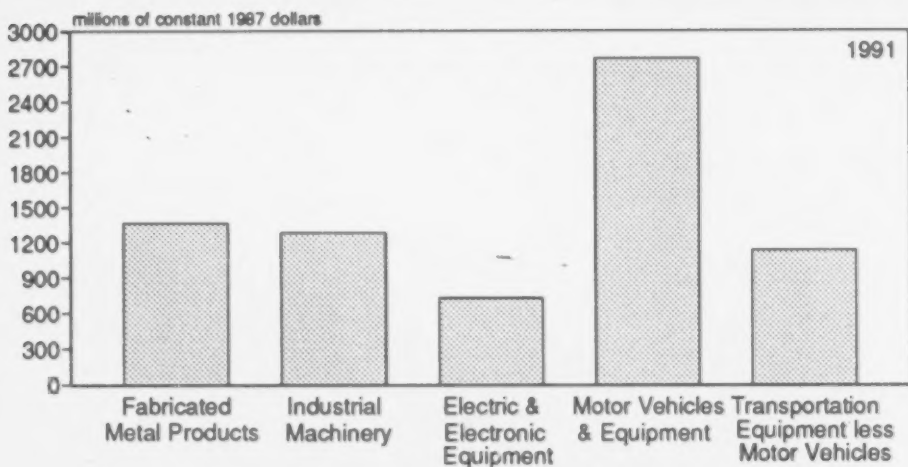
	Total All Industries			Manufacturing		
	1990(r)	1991(p)	1992(E)	1990(r)	1991(p)	1992(E)
World	\$61,235	\$63,052	\$65,772	\$29,353	\$28,203	\$29,583
Canada	9,586	8,431	8,517	4,332	3,770	3,592
Europe	33,681	34,911	36,126	17,964	17,339	18,444
EC	31,218	32,164	33,072	17,480	16,832	17,936
Belgium	1,664	1,409	1,435	1,144	963	981
France	3,825	3,781	4,015	2,428	2,327	2,571
Germany	6,189	6,835	7,069	4,662	5,081	5,298
Italy	2,057	1,741	1,881	1,111	1,110	1,240
Netherlands	2,205	2,068	2,219	1,473	1,306	1,335
Spain	1,333	1,407	1,724	1,045	988	1,279
United Kingdom	12,856	13,778	13,285	4,956	4,380	4,385
Other EC	1,089	1,146	1,445	661	508	874
Other Europe	2,464	2,748	3,054	504	508	508
Japan	2,100	2,216	2,419	1,458	1,544	1,489
Australia	2,303	2,572	2,387	748	881	851
New Zealand & S. Africa	252	275	301	60	55	68
Latin America and other Western Hemisphere	5,134	5,578	5,853	3,169	3,013	3,511
South America	3,313	3,265	3,387	2,237	2,002	2,237
Brazil	2,083	1,739	1,881	1,636	1,337	1,544
Other South America	1,229	1,526	1,506	601	665	693
Central America	1,177	1,496	1,751	901	957	D
Mexico	1,026	1,141	1,465	840	902	1,158
Other Central America	152	355	286	61	56	D
Other Western Hemisphere	644	817	714	32	54	D
Other Africa	1,414	1,456	1,535	38	39	43
Middle East	760	778	864	71	60	78
Other Asia and Pacific	5,050	5,757	6,641	1,492	1,501	1,508

Source: U.S. Department of Commerce, "Survey of Current Business" (March 1992)

Note: Capital expenditures previously were referred to as "property, plant and equipment expenditures." They represent gross outlays charged to capital accounts to acquire, add to, or improve real property, plant and equipment. Sales or other dispositions of fixed assets are not netted against these outlays.

CAPITAL EQUIPMENT PURCHASES

Metalworking Machinery

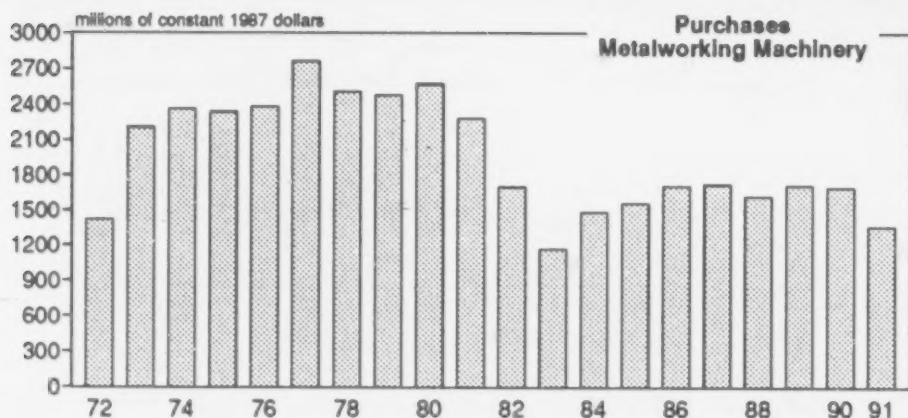


Year	Fabricated Metal Products	Industrial Machinery	Electric & Electronic Equipment	Motor Vehicles & Equipment	Transportation Equipment less Motor Vehicles
Current Dollars (millions)					
1987	\$2,457	\$2,156	\$736	\$4,818	\$1,592
1988	2,266	2,268	923	2,600	1,611
1989	2,446	2,568	977	4,307	1,711
1990	2,887	2,866	1,193	4,858	1,727
1991	2,568	2,493	1,080	4,277	1,617

Constant 1987 Dollars (millions)					
1972	\$1,421	\$730	\$923	\$3,540	\$607
1973	2,210	1,256	1,213	3,315	732
1974	2,364	1,703	1,268	4,112	893
1975	2,339	1,673	593	2,910	926
1976	2,383	1,619	426	3,235	1,022
1977	2,766	1,999	192	4,355	894
1978	2,514	2,786	337	5,253	807
1979	2,482	2,409	497	5,115	1,115
1980	2,574	2,731	704	5,128	1,262
1981	2,283	2,230	573	6,942	1,060
1982	1,703	2,299	760	3,015	1,114
1983	1,170	1,706	745	1,418	968
1984	1,489	1,841	938	2,816	1,262
1985	1,564	1,835	916	3,774	1,388
1986	1,710	1,513	808	3,836	1,554
1987	1,727	1,426	574	3,948	1,281
1988	1,623	1,625	768	1,864	1,310
1989	1,718	1,829	787	3,408	1,347
1990	1,702	1,673	867	3,391	1,142
1991	1,367	1,288	729	2,768	1,001

Sources: U.S. Department of Commerce, Bureau of Economic Analysis

CAPITAL EQUIPMENT PURCHASES

Fabricated Metal Products Industry
(SIC 34)

Year	Purchases of Metalworking Machinery	Depreciation of Metalworking Machinery	Net Investment in Metalworking Machinery	Average Age of Metalworking Machinery
------	---	--	--	---

Current Dollars (millions)

1986	\$3,945	\$1,917	\$2,028	10.39 yr.
1987	3,349	2,042	1,307	10.56
1988	3,569	2,157	1,412	10.71
1989	4,028	2,290	1,738	10.82
1990	4,386	2,462	1,924	10.95

Constant 1987 Dollars (millions)

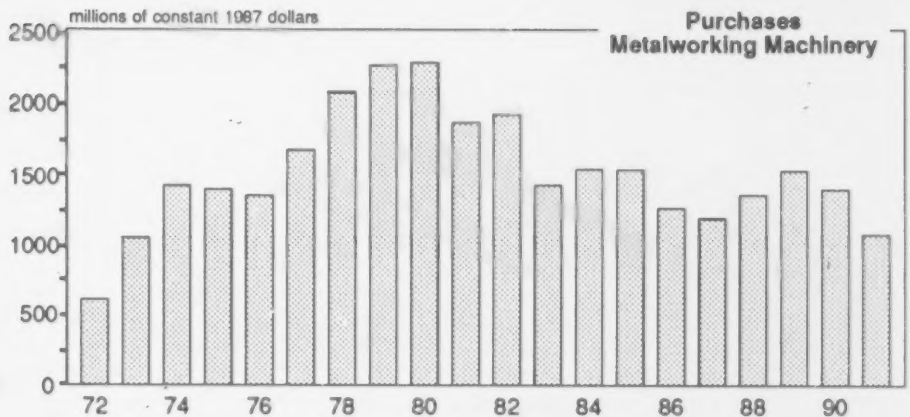
1972	\$1,421	\$1,074	\$347	10.65
1973	2,210	1,122	1088	10.44
1974	2,364	1,190	1174	10.25
1975	2,339	1,254	1085	10.09
1976	2,383	1,318	1065	9.95
1977	2,766	1,390	1376	9.76
1978	2,514	1,465	1049	9.70
1979	2,482	1,531	951	9.68
1980	2,574	1,598	976	9.68
1981	2,283	1,661	622	9.78
1982	1,703	1,703	0	10.02
1983	1,170	1,719	-549	10.41
1984	1,489	1,730	-241	10.71
1985	1,564	1,747	-183	10.98
1986	1,710	1,766	-56	11.21
1987	1,727	1,787	-60	11.44
1988	1,623	1,804	-18	11.70
1989	1,718	1,819	-101	11.92
1990	1,702	1,832	-130	12.14
1991	1,367	1,833	-466	12.43

Source: U.S. Department of Commerce, Bureau of Economic Analysis

Note: Net investment equals purchases less depreciation. Metalworking machinery includes machine tools, industrial patterns, tools and dies, cutting tools, power-driven hand tools, rolling mill machinery, and welding and soldering equipment.

CAPITAL EQUIPMENT PURCHASES

*Industrial Machinery Industry
(SIC 35)*

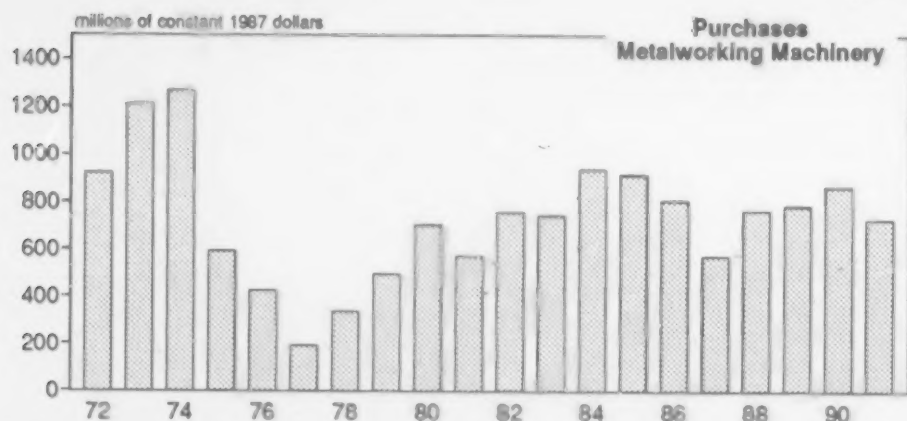


Year	Purchases of Metalworking Machinery	Depreciation of Metalworking Machinery	Net Investment in Metalworking Machinery	Average Age of Metalworking Machinery
Current Dollars (millions)				
1987	\$2,156	\$1,676	\$480	11.65 yr.
1988	2,268	1,737	531	11.83
1989	2,568	1,811	757	11.95
1990	2,866	1,914	952	12.13
1991	2,493	2,000	493	12.40
Constant 1987 Dollars (millions)				
1972	\$730	\$1,120	\$-390	11.97
1973	1,256	1,123	133	12.04
1974	1,703	1,148	555	11.94
1975	1,673	1,180	493	11.88
1976	1,619	1,209	410	11.85
1977	1,999	1,245	754	11.67
1978	2,486	1,297	1,189	11.37
1979	2,709	1,364	1,345	11.08
1980	2,731	1,436	1,295	10.85
1981	2,230	1,497	733	10.82
1982	2,299	1,547	752	10.78
1983	1,706	1,585	121	10.93
1984	1,841	1,612	229	11.06
1985	1,835	1,642	193	11.19
1986	1,513	1,664	-151	11.41
1987	1,426	1,676	-250	11.65
1988	1,625	1,688	-63	11.83
1989	1,829	1,707	122	11.95
1990	1,673	1,726	-53	12.13
1991	1,288	1,731	-443	12.40

Source: U.S. Department of Commerce, Bureau of Economic Analysis

Note: Net investment equals purchases less depreciation. Metalworking machinery includes machine tools, industrial patterns, tools and dies, cutting tools, power-driven hand tools, rolling mill machinery, and welding and soldering equipment.

CAPITAL EQUIPMENT PURCHASES

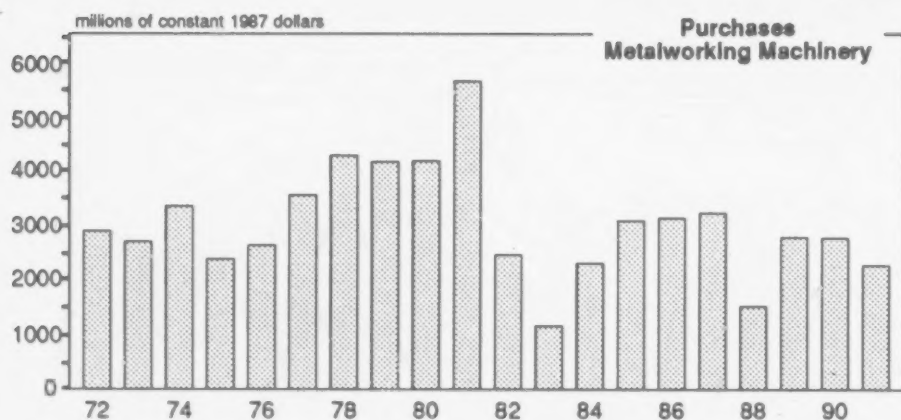
Electric & Electronic Equip. Industry
(SIC 36)

Year	Purchases of Metalworking Machinery	Depreciation of Metalworking Machinery	Net Investment in Metalworking Machinery	Average Age of Metalworking Machinery
Current Dollars (millions)				
1987	\$736	\$691	\$45	7.27 yr.
1988	923	708	215	7.14
1989	977	738	239	7.00
1990	1193	785	408	6.88
1991	1080	833	247	6.89
Constant 1987 Dollars (millions)				
1972	\$923	\$452	\$471	5.21
1973	1,213	515	698	4.98
1974	1,268	591	677	4.91
1975	593	641	-48	5.32
1976	426	657	-231	5.82
1977	192	655	-463	6.46
1978	337	645	-308	6.98
1979	497	643	-146	7.34
1980	704	649	55	7.49
1981	573	654	-81	7.72
1982	760	655	105	7.74
1983	745	659	86	7.74
1984	938	668	270	7.55
1985	916	684	232	7.37
1986	808	694	114	7.25
1987	574	691	-117	7.27
1988	768	688	80	7.14
1989	787	695	92	7.00
1990	867	708	159	6.88
1991	729	721	8	6.89

Source: U.S. Department of Commerce, Bureau of Economic Analysis

Note: Net investment equals purchases less depreciation. Metalworking machinery includes machine tools, industrial patterns, tools and dies, cutting tools, power-driven hand tools, rolling mill machinery, and welding and soldering equipment.

CAPITAL EQUIPMENT PURCHASES

Motor Vehicles & Equip. Industry
(SIC 371)

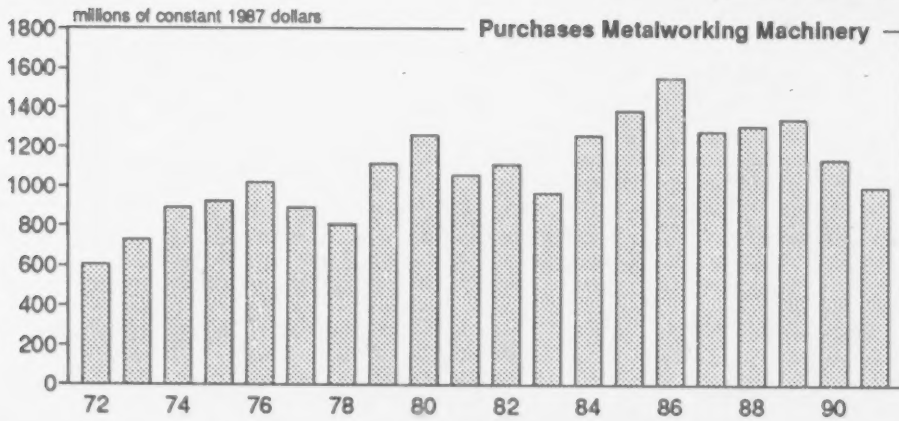
Year	Purchases of Metalworking Machinery	Depreciation of Metalworking Machinery	Net Investment in Metalworking Machinery	Average Age of Metalworking Machinery
Current Dollars (millions)				
1987	\$4,818	\$3,953	\$865	7.50 yr.
1988	2,600	3,987	-1,387	7.83
1989	4,307	3,999	308	7.90
1990	4,858	4,123	735	7.96
1991	4,277	4,199	78	8.06
Constant 1987 Dollars (millions)				
1972	\$3,540	\$2,772	\$768	6.28
1973	3,315	2,880	435	6.38
1974	4,112	3,004	1108	6.38
1975	2,910	3,105	-195	6.60
1976	3,235	3,161	74	6.76
1977	4,355	3,262	1093	6.76
1978	5,253	3,427	1826	6.67
1979	5,115	3,609	1506	6.62
1980	5,128	3,772	1356	6.59
1981	6,942	3,996	2946	6.39
1982	3,015	4,131	-1116	6.64
1983	1,418	4,046	-2628	7.07
1984	2,816	3,946	-1130	7.30
1985	3,774	3,930	-156	7.38
1986	3,836	3,946	-110	7.45
1987	3,948	3,953	-5	7.50
1988	1,864	3,875	-2011	7.83
1989	3,408	3,769	-361	7.90
1990	3,391	3,718	-327	7.96
1991	2,768	3,635	-867	8.06

Source: U.S. Department of Commerce, Bureau of Economic Analysis

Note: Net investment equals purchases less depreciation. Metalworking machinery includes machine tools, industrial patterns, tools and dies, cutting tools, power-driven hand tools, rolling mill machinery, and welding and soldering equipment.

CAPITAL EQUIPMENT PURCHASES

**Transportation Equip. Industry
Except Motor Vehicles & Equip.
(SIC 37 LESS 371)**



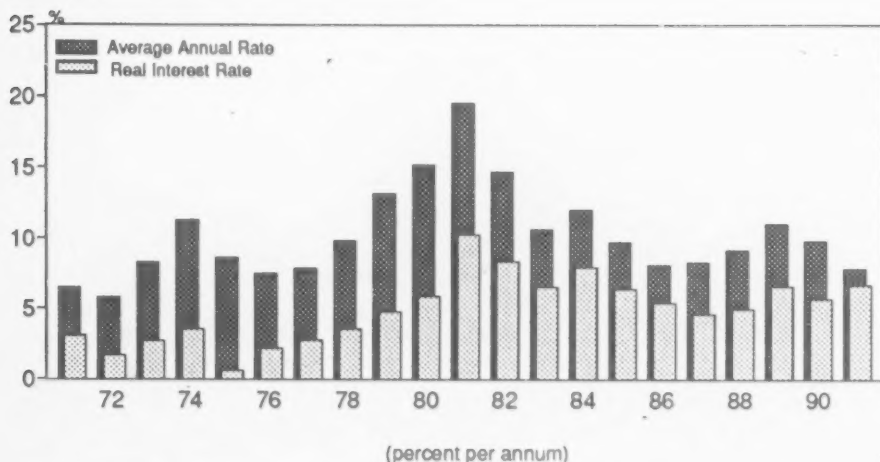
Year	Purchases of Metalworking Machinery	Depreciation of Metalworking Machinery	Net Investment in Metalworking Machinery	Average Age of Metalworking Machinery
Current Dollars (millions)				
1987	\$1,592	\$1,025	\$567	7.72 yr.
1988	1,611	1,089	522	7.78
1989	1,711	1,158	553	7.84
1990	1,727	1,240	487	8.00
1991	1,617	1,307	310	8.22
Constant 1987 Dollars (millions)				
1972	\$607	\$476	\$131	7.12
1973	732	501	231	7.17
1974	893	533	360	7.14
1975	926	570	356	7.14
1976	1,022	609	413	7.10
1977	894	645	249	7.20
1978	807	674	133	7.39
1979	1,115	708	407	7.41
1980	1,262	754	508	7.37
1981	1,060	795	265	7.48
1982	1,114	828	286	7.56
1983	968	856	112	7.72
1984	1,262	888	374	7.73
1985	1,388	931	457	7.73
1986	1,554	982	572	7.66
1987	1,281	1,025	256	7.72
1988	1,310	1,059	251	7.78
1989	1,347	1,092	255	7.84
1990	1,142	1,118	24	8.00
1991	1,001	1,132	-131	8.22

Source: U.S. Department of Commerce, Bureau of Economic Analysis

Note: Net investment equals purchases less depreciation. Metalworking machinery includes machine tools, industrial patterns, tools and dies, cutting tools, power-driven hand tools, rolling mill machinery, and welding and soldering equipment.

INTEREST RATES CHARGED BY BANKS ON BUSINESS LOANS

Short-term Rates



Year	Average Annual Rate	Real Interest Rate	February	May	August	November
1971	6.48%	3.09%	6.59%	6.01%	6.51%	6.18%
1972	5.82	1.68	5.52	5.59	5.84	6.33
1973	8.30	2.73	6.52	7.35	9.24	10.08
1974	11.28	3.56	9.91	11.15	12.40	11.64
1975	8.65	0.61	9.94	8.16	8.22	8.29
1976	7.52	2.18	7.54	7.44	7.80	7.28
1977	7.85	2.78	7.48	7.37	7.87	8.66
1978	9.84	3.55	8.95	9.01	9.97	11.44
1979	13.18	4.79	12.27	12.34	12.31	15.81
1980	15.17	5.91	15.67	17.75	11.56	15.70
1981	19.56	10.27	19.91	19.99	21.11	17.23
1982	14.69	8.42	17.13	17.11	13.27	11.26
1983	10.64	6.54	10.20	10.31	11.09	10.95
1984	12.02	7.99	11.06	12.45	13.29	11.29
1985	9.74	6.42	10.10	9.90	9.27	9.68
1986	8.11	5.43	9.29	8.13	7.73	7.28
1987	8.29	4.63	7.84	8.66	8.20	8.47
1988	9.18	4.98	8.37	8.49	9.75	10.11
1989	11.04	6.61	10.97	11.89	10.78	10.50
1990	9.85	5.73	9.93	9.97	9.72	9.77
1991	7.87	6.72	8.43	7.75	8.55	6.73

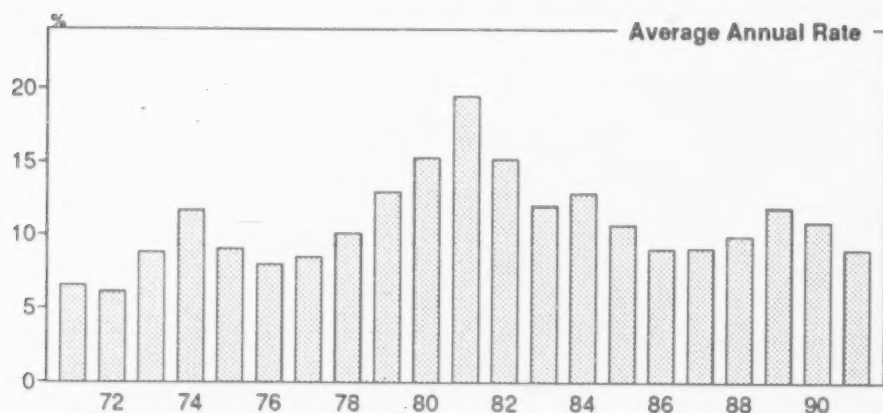
Sources: Federal Reserve Board; U.S. Bureau of Economic Analysis

Note: Real interest rates measure the after inflation cost of borrowing. We have used the Implicit GNP Deflator GDP from 91 as our measure of inflation since it is the broadest measure of inflation and is less likely to be distorted by a large increase in a sensitive area.

The maturation period for short-term loans is less than one year.

**INTEREST RATES CHARGED
BY BANKS ON BUSINESS LOANS**

Long-term Rates



(percent per annum)

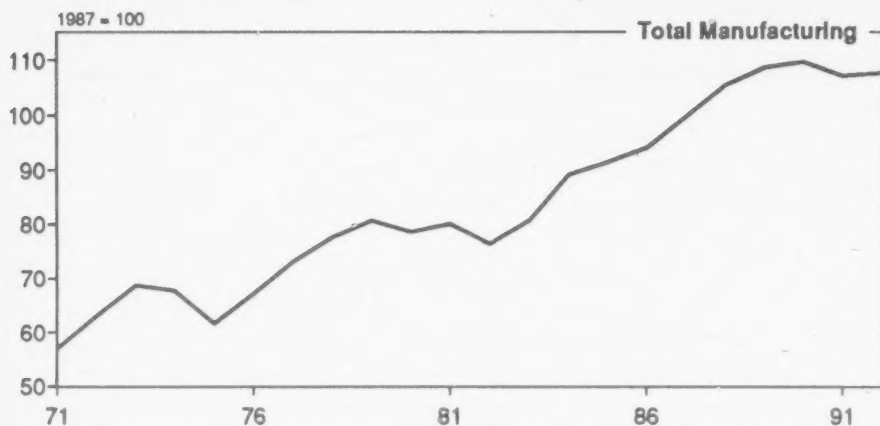
Year	Average Annual Rate	February	May	August	November
1971	6.57%	6.82%	6.36%	6.67%	6.44%
1972	6.12	5.64	5.87	6.31	6.67
1973	8.83	7.12	7.67	9.85	10.68
1974	11.70	10.16	11.41	13.08	12.16
1975	9.06	10.26	8.22	8.89	8.88
1976	7.99	8.02	8.02	8.45	7.48
1977	8.52	9.05	8.24	8.09	8.71
1978	10.11	9.19	9.67	10.20	11.38
1979	12.98	12.01	12.08	12.25	15.56
1980	15.32	15.79	18.37	12.06	15.07
1981	19.52	19.26	19.25	20.62	18.94
1982	15.25	16.59	16.96	15.22	12.24
1983	12.01	11.81	11.46	11.83	12.94
1984	12.89	11.92	13.12	13.81	12.69
1985	10.72	11.10	11.03	10.44	10.31
1986	9.08	10.26	9.07	8.73	8.24
1987	9.11	9.14	9.44	8.78	9.09
1988	9.92	9.41	9.05	10.44	10.79
1989	11.87	11.71	12.76	11.64	11.36
1990	10.89	10.92	11.08	10.72	10.82
1991	9.01	9.34	9.24	9.70	7.76

Source: Federal Reserve Board

Note: The maturation period for long-term loans exceeds one year.

MANUFACTURING STATISTICS

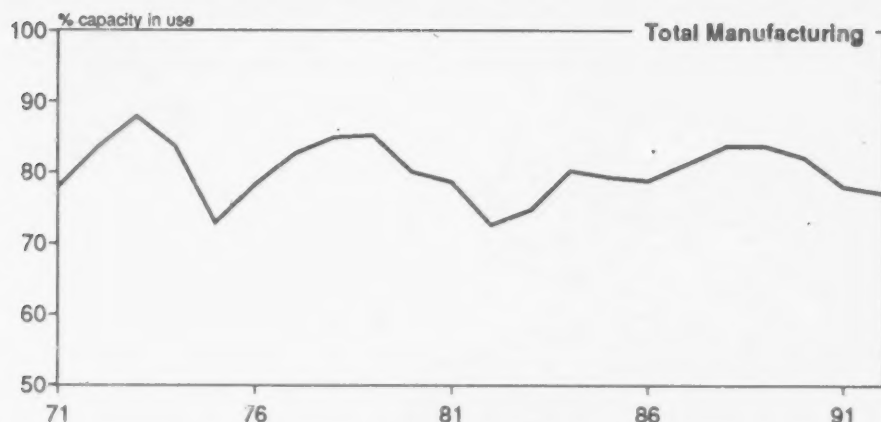
Industrial Production Indexes



(seasonally adjusted, 1987= 100)

Year	Total Mfg.	Total Durables	Electrical Machinery	Machinery, Except Electrical	Motor Vehicles & Parts	Primary Metals	Fabricated Metals
1971	57.3	53.1	40.7	30.5	66.9	109.2	75.6
1972	63.3	59.3	46.5	35.4	73.0	122.4	82.9
1973	68.9	66.2	53.0	41.4	85.0	138.9	92.1
1974	67.9	64.8	52.4	44.1	73.4	134.5	88.4
1975	61.1	56.7	45.1	38.1	62.2	107.2	76.7
1976	67.4	62.6	50.7	40.0	81.9	119.9	84.9
1977	73.3	68.7	58.4	45.1	94.7	121.5	92.7
1978	77.8	73.9	64.0	50.2	99.2	130.7	96.2
1979	80.9	78.3	71.3	56.9	91.0	133.0	99.5
1980	78.8	75.7	73.3	60.6	67.0	110.8	92.5
1981	80.3	77.4	75.4	65.9	64.4	117.5	91.1
1982	76.6	72.7	75.9	63.9	58.8	83.2	83.2
1983	80.9	76.8	80.3	64.3	74.5	91.0	85.5
1984	89.3	88.4	94.1	80.8	90.6	102.4	93.3
1985	91.6	91.8	93.1	86.8	99.0	101.8	94.5
1986	94.3	93.9	94.3	90.4	98.5	93.8	93.8
1987	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1988	105.8	107.6	106.5	113.8	105.5	110.3	106.2
1989	108.9	110.9	109.5	121.8	104.9	109.2	107.2
1990	109.9	111.6	111.5	126.5	96.8	108.3	105.9
1991	107.5	107.1	110.3	123.5	90.8	99.6	100.4
1991 1st Qtr.	106.1	106.1	108.1	124.4	80.7	98.0	99.5
2nd Qtr.	106.7	106.6	110.6	123.4	89.5	95.9	99.0
3rd Qtr.	108.5	108.1	111.2	123.5	95.9	102.0	101.4
4th Qtr.	108.6	107.7	110.3	122.9	97.0	102.4	101.6
1992 1st Qtr.	108.0	106.6	110.5	122.1	91.7	102.2	100.1

Source: Federal Reserve Board

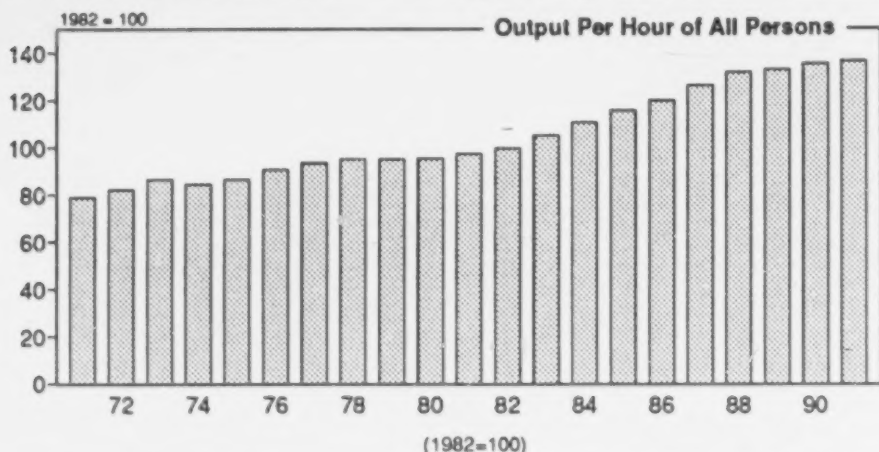


Year	Total Mfg.	Total Durables	Electrical Machinery	Machinery, Except Electrical	Motor Vehicles & Parts	Primary Metals	Fabricated Metals
1971	78.2%	74.3%	72.4%	73.3%	79.6%	75.1%	73.7%
1972	83.7	80.9	79.7	82.8	82.6	84.0	79.9
1973	88.1	87.5	86.6	93.4	91.5	94.0	86.8
1974	83.8	82.7	80.6	94.9	76.2	91.2	80.9
1975	73.2	70.2	66.1	78.6	62.8	72.1	68.6
1976	78.5	75.4	71.9	78.9	79.6	79.4	74.6
1977	82.8	80.3	79.7	84.4	88.9	79.7	79.8
1978	85.1	83.5	83.2	87.6	89.6	86.9	80.8
1979	85.4	84.9	87.6	90.7	79.2	87.9	82.0
1980	80.2	78.6	84.7	86.2	57.8	73.6	75.1
1981	78.8	76.6	81.3	82.5	56.5	77.9	72.6
1982	72.8	69.0	76.4	71.7	52.5	55.4	65.8
1983	74.9	70.5	76.7	66.0	65.4	62.3	67.9
1984	80.4	78.3	85.7	75.7	78.6	72.7	74.3
1985	79.5	77.8	80.7	73.4	83.4	74.0	74.9
1986	79.0	76.1	78.3	69.6	79.5	70.7	73.9
1987	81.4	78.6	80.0	72.4	78.1	79.6	78.5
1988	83.9	82.5	82.3	79.5	80.5	88.8	83.1
1989	83.9	82.8	81.6	82.2	79.2	86.6	83.1
1990	82.3	81.1	79.9	82.2	72.6	84.9	80.8
1991	78.2	75.8	76.1	77.0	67.5	77.3	75.6
1991 1st Qtr.	78.0	75.8	75.8	78.8	60.5	78.4	75.3
2nd Qtr.	77.9	75.7	76.8	77.2	66.7	74.6	74.7
3rd Qtr.	78.7	76.2	76.5	76.6	71.1	79.1	76.2
4th Qtr.	78.2	75.4	75.3	75.4	71.5	79.2	76.2
1992 1st Qtr.	77.3	74.2	74.7	74.3	67.3	79.1	74.8

Source: Federal Reserve Board

MANUFACTURING STATISTICS

Productivity in Durable Manufacturing

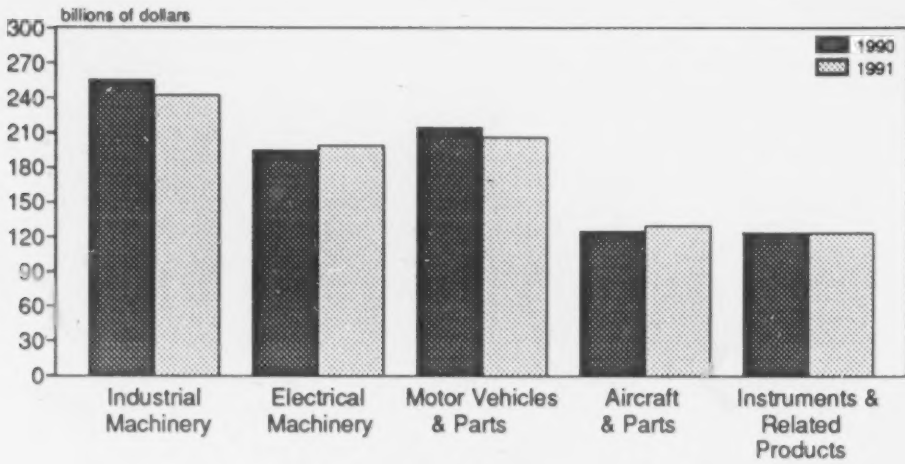


Year	Productivity (a) (Output Per Hour of All Persons)	Output	Hours (All Persons)	Hourly (b) Compensation	Unit Labor Costs
1971	79.0	81.2	102.8	90.3	47.9
1972	82.3	88.4	107.5	92.0	48.4
1973	86.7	97.9	112.9	93.3	49.5
1974	84.5	93.2	110.3	93.4	56.5
1975	86.7	86.3	99.5	95.8	61.6
1976	90.8	94.6	104.2	98.1	63.7
1977	93.6	101.6	108.6	100.2	67.2
1978	95.2	107.7	113.1	101.0	71.6
1979	95.2	109.8	115.3	99.5	78.6
1980	95.4	104.8	109.9	98.0	87.8
1981	97.5	106.5	109.3	97.5	94.1
1982	100.0	100.0	100.0	100.0	100.0
1983	105.2	106.4	101.2	99.4	97.5
1984	110.8	119.4	107.8	98.4	95.6
1985	115.9	124.0	107.0	99.7	95.9
1986	120.3	126.8	105.4	102.3	96.6
1987	126.4	132.3	106.2	101.0	95.5
1988	132.1	139.9	109.4	100.2	96.1
1989	133.3	144.0	109.8	99.4	97.4
1990(r)	135.4	144.7	106.9	97.8	97.8
1991	136.8	138.9	101.3	97.9	101.0
1991 1st Qtr.	137.2	137.6	101.4	98.1	100.5
2nd Qtr.	135.7	138.3	101.1	97.6	100.9
3rd Qtr.	136.8	140.2	101.5	98.1	100.6
4th Qtr.	138.4	139.7	100.9	98.7	101.8
1992 1st Qtr.(p)	137.4	138.3	100.7	96.8	101.4

Source: U.S. Department of Labor, Bureau of Labor Statistics

Note: (a) - The productivity index is obtained by dividing the constant dollar output index by the labor input (hours) index, (b) - Compensation per hour adjusted for changes in the Consumer Price Index for Urban Consumers

This table is based on output and compensation data published by the Department of Commerce. The indexes for manufacturing output, which are based on figures taken from Gross National Product components, vary from those for manufacturing production in the tables of industrial production indexes. The latter are generated independently by the Federal Reserve Board from its own survey and using its own methodology.

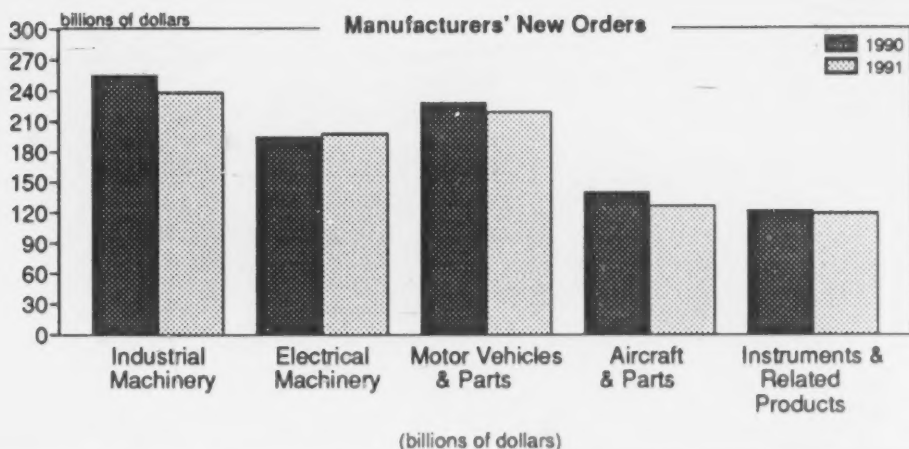


(billions of dollars)

Year	Total Manufacturing	Durables	By Industry Group			
			Primary Metals	Fabricated Metal Products	Industrial Machinery	Electrical Machinery
1982	\$1,960.2	\$950.5	\$104.9	\$119.2	\$186.8	\$125.7
1983	2,070.6	1,025.8	109.2	123.1	178.4	136.1
1984	2,288.2	1,175.3	120.3	138.1	211.1	162.4
1985	2,334.5	1,215.4	112.3	143.3	218.4	164.0
1986	2,335.9	1,238.9	107.9	143.1	213.6	164.8
1987	2,475.9	1,297.5	120.2	147.4	217.7	171.3
1988	2,682.5	1,415.9	149.1	158.8	243.3	186.9
1989(r)	2,792.7	1,460.4	153.0	162.2	253.6	192.3
1990(r)	2,873.5	1,468.6	146.1	163.1	256.3	194.8
1991(p)	2,821.7	1,422.6	130.0	156.9	242.8	199.5

Year	Motor Vehicles and Parts	Aircraft and Parts	Instruments & Related Products	By Capital Goods Industries	
				Nondefense	Defense
1982	\$112.3	\$66.4	\$74.9	\$252.1	\$60.2
1983	148.3	75.0	79.6	242.3	73.8
1984	182.0	79.1	89.4	278.9	82.3
1985	193.4	91.3	96.2	293.4	95.3
1986	198.8	101.8	100.8	290.0	106.2
1987	205.9	103.6	107.3	295.3	109.4
1988	221.6	107.7	114.5	331.1	105.3
1989(r)	225.6	113.5	118.5	347.0	103.0
1990(r)	215.0	125.2	123.8	363.7	104.9
1991(p)	206.4	129.7	123.9	365.7	101.9

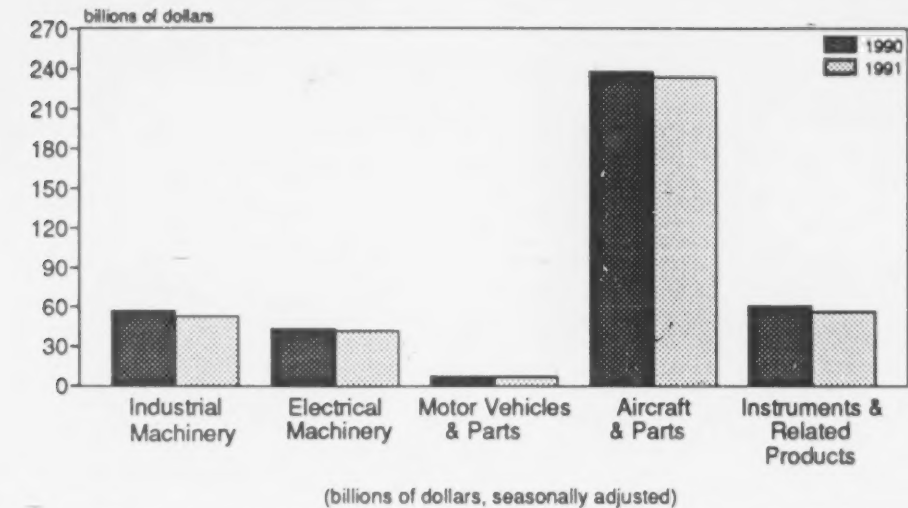
Source: U. S. Department of Commerce, Bureau of the Census, "Manufacturers' Shipments, Inventories, and Orders"



Year	Total Manufacturing	Durables	By Industry Group			
			Primary Metals	Fabricated Metal Products	Industrial Machinery	Electrical Machinery
1982	\$1,945.7	\$936.8	\$98.4	\$113.4	\$169.3	\$127.6
1983	2,105.4	1,057.7	113.9	122.8	178.9	142.1
1984	2,314.5	1,202.0	118.4	141.7	212.1	165.5
1985	2,348.5	1,228.3	112.3	142.3	218.4	163.4
1986	2,342.4	1,243.8	108.2	143.5	208.6	164.3
1987	2,512.7	1,329.7	126.0	150.7	221.2	173.2
1988	2,724.3	1,457.3	151.7	157.4	248.7	188.7
1989(r)	2,830.9	1,498.9	149.8	157.9	254.2	189.4
1990(r)	2,885.0	1,479.9	146.6	161.3	255.7	195.0
1991(p)	2,805.3	1,404.8	127.6	155.7	239.0	198.2

Year	Motor Vehicles and Parts	Aircraft and Parts	Instruments & Related Products	By Capital Goods Industries	
				Nondefense	Defense
1982	\$120.1	\$73.4	\$82.1	\$230.6	\$81.4
1983	161.6	87.0	83.1	235.5	96.1
1984	191.4	91.6	98.9	284.0	103.5
1985	202.5	100.9	106.3	294.5	109.5
1986	210.0	108.0	104.6	287.8	111.9
1987	220.3	114.8	109.1	313.1	111.6
1988	235.0	136.9	112.7	368.7	104.3
1989(r)	239.0	162.3	118.3	392.7	101.0
1990(r)	228.2	140.1	121.6	386.7	94.9
1991(p)	219.7	126.2	119.4	358.3	93.7

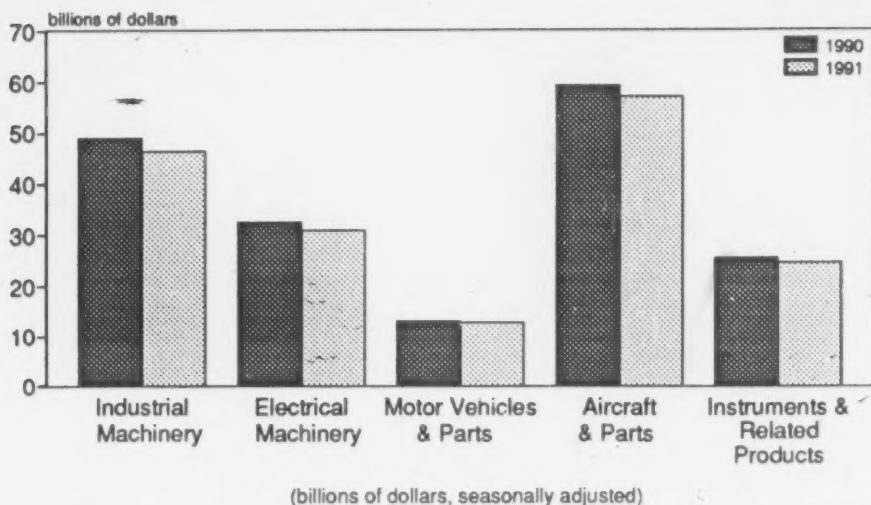
Source: U. S. Department of Commerce, Bureau of the Census, "Manufacturers' Shipments, Inventories, and Orders"



Year	Total Manufacturing	Durables	By Industry Group			
			Primary Metals	Fabricated Metal Products	Industrial Machinery	Electrical Machinery
1982	\$311.9	\$300.8	\$15.5	\$27.1	\$51.9	\$34.6
1983(r)	347.3	333.1	20.4	26.8	52.4	40.8
1984(r)	373.5	359.6	18.4	30.3	53.5	44.0
1985(r)	387.1	372.0	18.3	29.2	53.4	43.3
1986(r)	393.4	376.6	18.6	29.7	48.4	42.7
1987(r)	430.3	408.6	24.4	33.0	51.8	44.6
1988(r)	417.9	450.0	27.0	31.6	57.3	46.4
1989(r)	510.1	488.4	23.6	27.4	57.8	43.5
1990(r)	521.8	499.8	24.2	25.6	57.2	43.6
1991(p)	505.6	482.2	21.8	24.5	53.4	42.3

Year	Motor Vehicles and Parts	Aircraft and Parts	Instruments & Related Products	By Capital Goods Industries	
				Nondefense	Defense
1982(r)	\$7.8	\$93.7	\$37.5	\$121.1	\$99.1
1983(r)	11.8	105.5	41.0	114.3	121.2
1984(r)	10.8	117.9	50.5	119.4	142.3
1985(r)	9.5	127.4	60.5	120.5	156.3
1986(r)	9.6	133.6	64.0	118.3	161.8
1987(r)	11.6	145.0	65.4	136.1	163.8
1988(r)	11.2	174.4	63.3	173.6	162.9
1989(r)	9.3	223.2	63.1	219.4	160.8
1990(r)	7.5	238.2	61.0	242.4	151.0
1991(p)	7.1	234.7	56.6	235.0	142.9

Source: U. S. Department of Commerce, Bureau of the Census, "Manufacturers' Shipments, Inventories, and Orders"



Year	Total Manufacturing	Durables	By Industry Group			
			Primary Metals	Fabricated Metal Products	Industrial Machinery	Electrical Machinery
1982	\$311.8	\$200.4	\$24.2	\$21.4	\$47.9	\$25.1
1983	312.4	199.8	22.3	21.8	44.6	26.9
1984	339.5	221.3	22.4	23.3	48.7	31.6
1985	334.8	218.2	20.0	22.9	46.5	30.5
1986	322.7	212.0	18.5	22.1	42.4	28.6
1987(r)	338.1	220.8	19.1	22.9	43.1	29.9
1988(r)	367.4	241.4	22.3	24.8	47.5	31.5
1989(r)	386.8	255.9	22.5	25.0	49.8	33.1
1990(r)	398.9	259.7	22.2	24.6	49.1	32.5
1991(p)	386.0	247.0	20.2	22.7	46.4	30.9

Year	Motor Vehicles and Parts	Aircraft and Parts	Instruments & Related Products	By Capital Goods Industries	
				Nondefense	Defense
1982	\$8.5	\$30.4	\$17.0	\$73.7	\$18.9
1983	10.4	30.1	17.8	68.4	21.1
1984	11.7	35.6	20.2	75.4	27.2
1985	11.8	37.3	21.6	71.7	31.1
1986	11.5	38.3	22.5	67.6	31.5
1987	11.9	40.6	23.7	68.7	34.4
1988	12.2	46.8	25.0	76.6	37.1
1989(r)	11.9	56.2	25.5	85.6	39.8
1990(r)	13.0	59.3	25.6	87.2	40.2
1991(p)	12.8	57.2	24.6	85.4	36.2

Source: U. S. Department of Commerce, Bureau of the Census, "Manufacturers' Shipments, Inventories, and Orders"

(1982 = 100, unless otherwise indicated)

Commodity	1987	1988	1989	1990	1991
Machine Tool Indexes					
Metal Cutting Machine Tools	112.6	117.4	123.4	129.8	134.6
Metal Forming Machine Tools	110.2	113.2	118.1	128.7	133.6
Finished Goods	105.4	108.0	113.6	119.2	121.3
All Commodities	102.8	106.9	112.2	116.3	116.2
Industrial Commodities	102.6	106.3	111.6	115.8	116.1
Durable Manufactured Goods	109.6	114.1	118.3	120.7	122.5
Industrial Power, 500 kW Demand	111.9	112.6	116.8	119.6	127.3
Prepared Paint	108.1	112.2	119.5	124.8	129.4
Iron and Steel	104.5	115.7	119.1	117.2	114.0
Foundry and Forge Shop Products	105.6	109.6	114.6	117.2	118.8
Gray & Ductile Iron Cast	103.4	106.0	108.8	111.6	113.1
Steel Mill Products	102.3	110.7	114.5	112.1	109.6
Semi-finished Steel Products	100.2	109.0	113.1	107.3	105.0
Finished Steel Products	102.3	110.6	114.5	112.8	110.6
Nonferrous Metals	108.7	133.2	141.5	133.8	123.5
Primary Nonferrous Metals	109.2	144.3	149.2	133.4	114.3
Nonferrous Mill Shapes	105.7	130.1	137.4	130.7	125.1
Aluminum Mill Shapes	105.5	130.9	135.4	127.9	123.3
Nonferrous Wire and Cable	106.5	129.6	146.1	142.6	139.1
Metalworking Machinery and Equipment	110.1	113.5	118.2	123.0	127.2
Cutting Tools & Accessories	108.9	111.0	115.0	118.5	121.2
Abrasive Products	108.1	111.3	118.7	122.3	126.3
General Purpose Machinery & Equipment	108.3	112.7	119.0	123.7	127.4
Pumps, Compressors, & Equipment	105.2	108.9	115.0	119.2	124.2
Fluid Power Equipment	111.3	114.6	119.7	123.6	128.2
Mechanical Power Transmission Equip.	112.0	116.0	121.1	125.3	128.8
Miscellaneous General Purpose Equip.	109.0	115.4	124.4	130.9	136.3
Ball & Roller Bearings	107.8	114.0	124.1	130.6	136.4
Electrical Machinery and Equipment	112.7	114.4	117.5	119.3	120.7
Motors, Generators & Mtr Generator Sets	115.4	121.8	129.0	132.9	134.7
Integral Elec. Motors, AC (a)	105.6	113.9	121.7	130.6	133.4
Transformers and Power Regulators	107.6	108.8	117.3	120.9	123.6
Switchgear, Switchboard, etc. Equip.	110.2	113.2	119.0	124.4	128.1
Industrial Controls	109.1	111.9	116.6	122.0	126.5
Electronic Components & Accessories	115.1	117.5	119.4	118.4	118.6
Other Manufacturing Technology Indexes					
Assembly Machines (a)	110.2	113.4	116.6	118.5	124.5
Precision Measuring Tools	115.2	120.5	124.7	129.1	132.7
Industrial Material Handling Equipment	104.3	107.5	111.7	115.0	117.2
Plasticworking Machinery	124.9	129.4	134.2	138.2	142.4
Semiconductor Machinery & Parts (b)	na	100.8	103.8	108.3	114.9
Integrating and Measuring Equipment	113.7	115.2	119.7	126.7	130.5

Source: U. S. Department of Labor, Bureau of Labor Statistics

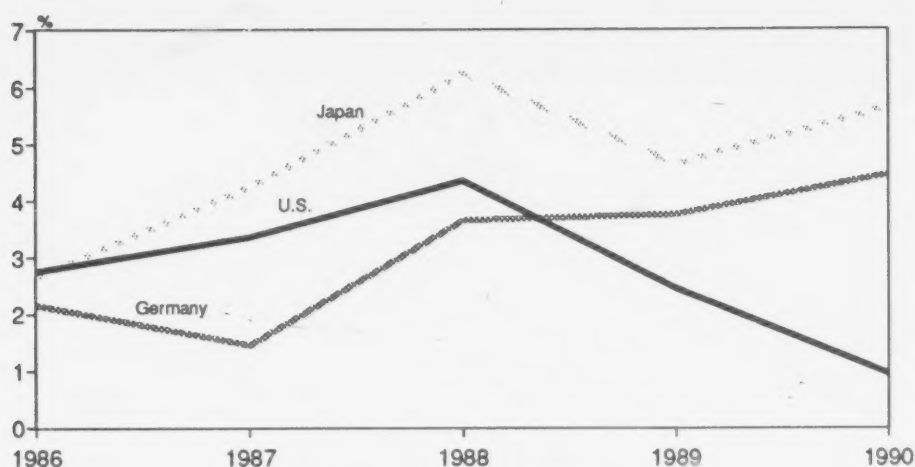
Note: (a) - June 1983 = 100, (b) - June 1987 = 100, na - not available

The individual commodities shown are selected components of each major commodity grouping.
All indexes are annual averages.

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(percent change from previous year)

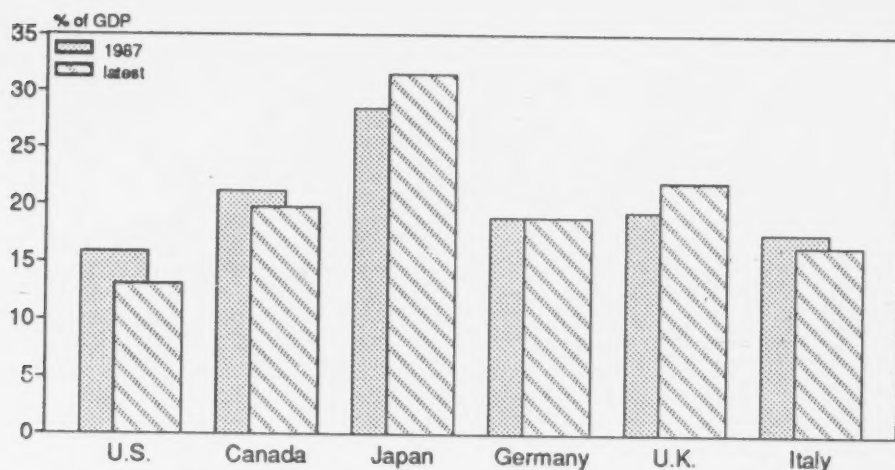
	1986	1987	1988	1989	1990
Argentina	5.6%	2.5%	-2.7%	-4.4%	-0.7%
Australia	2.4	4.3	3.5	4.5	1.2
Brazil	7.5	3.6	0.0	3.3	-4.0
Canada	3.3	4.0	4.4	3.0	0.9
Chile	4.1	5.7	7.4	9.9	4.0
China	8.3	11.0	10.8	3.9	5.0
France	2.5	2.2	3.8	3.7	2.8
Germany	2.2	1.5	3.7	3.8	4.5
Hungary	na	4.1	-0.1	-0.2	-5.0
Italy	2.9	3.1	4.1	3.0	2.0
Japan	2.7	4.3	6.3	4.7	5.7
Korea	12.4	12.0	11.5	6.2	9.0
Malaysia	1.0	5.4	8.9	8.8	10.0
Mexico	-3.7	1.5	1.4	3.1	4.4
Poland	na	1.7	4.1	0.2	-11.6
Singapore	2.0	9.4	11.1	9.2	8.3
Spain	3.3	5.6	5.2	4.8	3.7
Sweden	2.2	2.5	2.9	2.0	0.5
Switzerland	2.9	2.0	2.9	3.5	2.6
Taiwan	na	12.3	7.3	7.2	5.2
Thailand	4.9	9.5	13.2	12.0	10.0
United Kingdom	4.0	4.6	3.9	1.9	0.7
United States	2.8	3.4	4.4	2.5	1.0

Source: International Monetary Fund; Government data

Note: International comparisons of gross domestic product must be used with extreme caution. Measuring the size of economies that do not use the market system is a very difficult task.

INTERNATIONAL INVESTMENT PATTERNS

Gross Fixed Capital Formation as a Percent of GDP



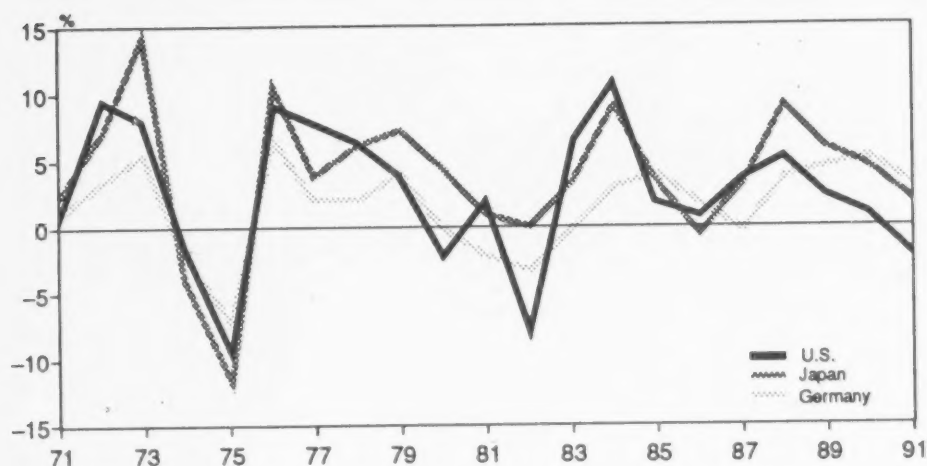
(percent of GDP)

	1987	1988	1989	1990	1991
United States	15.9%	15.9%	15.3%	14.6%	13.1%
Canada	21.2	22.0	22.6	21.2	19.8
Japan	28.5	29.9	31.0	32.2	31.6
Sweden	18.9	19.7	21.5	20.7	18.9
Germany	19.4	19.6	20.3	21.2	22.0
United Kingdom	17.6	19.0	19.9	19.2	16.5
Italy	19.7	20.1	20.2	20.2	na
Brazil	22.3	22.8	24.9	21.7	na
Venezuela	21.8	22.8	17.2	14.2	18.1
Czechoslovakia	14.9	13.5	12.9	16.0	13.3
South Korea	28.7	29.2	31.6	36.5	38.0
Indonesia	31.4	31.5	35.2	36.5	na
Singapore	35.6	34.7	36.1	37.3	39.9

Source: International Monetary Fund, "International Financial Statistics"

Note: Fixed Capital Formation consists of non-residential structures and producers' durable equipment as well as residential structures.

H



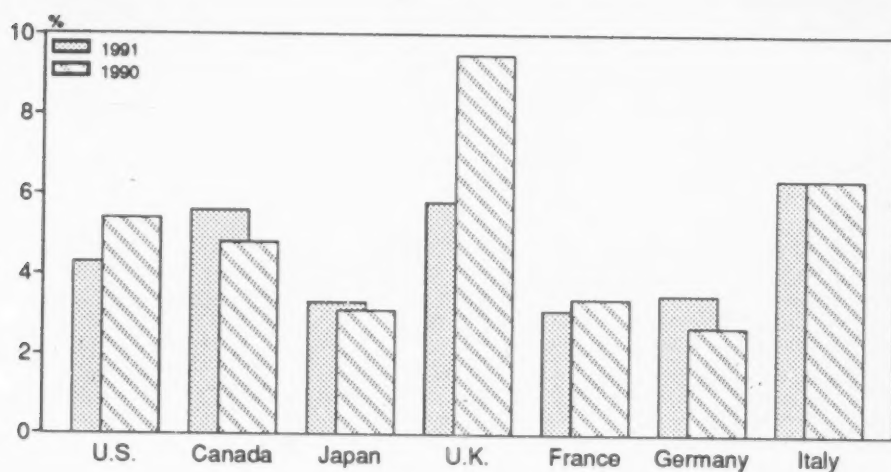
Year	United States	Canada	Japan	United Kingdom	France	Germany	Italy
1972	9.7	7.6	7.3	1.8	5.1	3.6	4.2
1973	8.1	9.9	14.9	9.0	7.3	5.7	9.7
1974	-1.5	3.5	-3.9	-2.1	2.3	-2.2	4.5
1975	-8.8	-6.1	-11.0	-5.4	-6.7	-6.7	-9.1
1976	9.3	5.5	11.2	3.3	8.3	7.1	12.3
1977	7.9	2.3	4.1	5.2	1.1	2.2	-0.8
1978	6.5	4.0	6.3	2.8	2.2	2.2	3.8
1979	4.0	6.0	7.4	3.9	4.3	4.3	6.7
1980	-1.9	-3.4	4.6	-6.6	1.0	0.0	5.5
1981	2.3	2.0	1.1	-3.1	-2.0	-2.0	-1.5
1982	-7.2	-9.8	0.2	1.9	0.0	-3.1	-3.0
1983	6.5	7.5	3.6	3.7	0.0	0.0	-3.2
1984	11.1	12.1	9.4	0.2	2.1	3.2	3.2
1985	2.0	5.6	3.7	5.4	1.0	4.2	1.1
1986	1.0	-0.1	-0.3	2.2	1.0	2.0	3.6
1987	3.8	5.7	3.4	3.5	2.0	0.0	4.0
1988	5.4	6.2	9.5	3.7	3.9	3.9	5.9
1989	2.5	1.1	6.0	0.3	3.8	4.7	3.1
1990(r)	1.1	-3.3	4.7	-0.5	1.8	5.4	0.1
1991(p)	-1.9	-4.4	2.2	-2.9	0.0	3.4	-2.1

Source: International Monetary Fund, "International Financial Statistics"

Note: 'Excludes construction

ANNUAL CHANGE IN PRICES

Consumer Prices

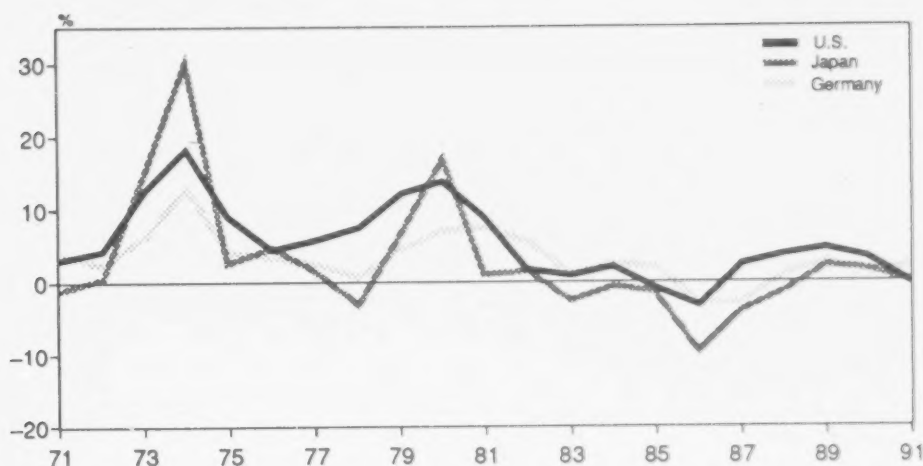


Year	United States	Canada	Japan	United Kingdom	France	Germany	Italy
1972	3.5%	4.8%	4.8%	7.5%	6.4%	5.5%	6.1%
1973	6.2	7.5	11.7	9.1	7.4	7.2	10.3
1974	10.9	11.0	23.3	15.9	13.5	6.8	19.2
1975	9.2	10.8	11.6	24.1	11.9	5.9	17.1
1976	6.0	7.4	9.5	16.6	9.6	4.3	16.7
1977	6.4	8.1	8.1	15.9	9.5	3.8	18.6
1978	7.6	9.0	4.3	8.2	9.1	2.6	12.0
1979	11.2	9.1	3.7	13.4	10.7	4.1	14.8
1980	13.5	10.1	7.7	18.0	13.2	5.5	21.3
1981	10.4	12.4	5.0	11.9	13.4	6.3	19.5
1982	6.0	10.8	2.7	8.6	11.8	5.2	16.5
1983	3.2	5.9	1.8	4.5	9.6	3.4	14.7
1984	4.3	4.3	2.3	5.0	7.5	2.4	10.8
1985	3.5	4.0	2.0	6.0	5.7	2.1	9.2
1986	1.9	4.2	0.6	3.4	2.5	-0.1	5.9
1987	3.7	4.3	0.1	4.2	3.3	0.2	4.7
1988	4.0	4.0	0.7	4.9	2.7	1.3	5.0
1989	4.8	5.0	2.3	7.8	3.5	2.8	6.3
1990	5.4	4.8	3.1	9.5	3.4	2.7	6.4
1991(p)	4.3	5.6	3.3	5.8	3.1	3.5	6.4

Source: International Monetary Fund, "International Financial Statistics"

ANNUAL CHANGE IN PRICES

Producer Prices



Year	United States	Canada	Japan	United Kingdom	France (a)	Germany	Italy
1972	4.6%	4.5%	0.8%	5.0%	4.5%	2.7%	3.5%
1973	13.0	11.3	15.8	7.3	14.8	6.6	17.6
1974	18.8	19.0	31.4	23.7	29.2	13.6	40.2
1975	9.3	11.1	3.0	23.1	-5.8	4.5	8.6
1976	4.8	5.2	5.1	16.1	7.3	3.7	23.0
1977	6.1	7.9	1.9	18.2	5.7	2.9	17.5
1978	7.8	9.2	-2.6	9.8	4.4	1.1	8.4
1979	12.5	14.6	7.3	10.9	13.3	4.8	15.4
1980	14.2	13.5	17.8	14.1	8.8	7.5	20.0
1981	9.1	10.1	1.4	9.6	11.0	7.8	17.6
1982	2.0	6.1	1.8	7.7	11.0	5.9	13.8
1983	1.2	3.4	-2.2	5.4	11.1	1.5	9.8
1984	2.4	4.1	-0.3	5.8	13.2	2.8	10.4
1985	-0.5	2.7	-1.1	5.3	4.1	2.5	7.3
1986	-2.9	0.8	-9.1	4.3	-2.8	-2.5	-0.9
1987	2.7	2.7	-3.7	3.9	0.2	-2.5	2.6
1988(r)	4.0	3.9	-1.0	4.4	5.2	1.3	4.7
1989(r)	4.9	2.7	2.5	5.1	5.5	3.1	6.4
1990(r)	3.6	0.3	2.0	5.9	-1.2	1.7	7.4
1991(p)	0.2	-1.0	0.2	5.6	-1.3	2.4	5.2

Source: International Monetary Fund, "International Financial Statistics"

Note: (a) - intermediate industrial goods prices

	United States	Canada	Japan	France	Germany	Italy	United Kingdom
Output Per Man Hour (Productivity) (1982 = 100)							
1981	97.9	104.8	95.5	93.4	100.5	97.8	94.5
1982	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1983	105.0	107.3	101.9	102.5	105.3	105.2	108.4
1984	110.0	116.4	106.1	104.5	108.9	115.8	114.0
1985	114.8	119.8	112.0	108.8	112.9	122.3	117.8
1986	120.0	117.9	110.3	110.8	113.5	123.7	122.6
1987	126.4	118.4	119.4	113.0	111.7	127.2	130.1
1988	132.1	117.1	126.6	120.6	115.6	130.5	137.3
1989	133.3	119.0	133.1	126.4	120.6	134.5	143.9
1990	136.6	121.2	138.1	127.7	124.8	138.8	145.1
Unit Labor Cost (1982 = 100)							
1981	93.8	88.9	112.6	109.2	101.7	103.2	112.1
1982	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1983	97.7	99.0	105.7	92.9	94.8	99.1	85.5
1984	96.3	91.0	104.6	86.5	86.2	89.5	76.8
1985	96.8	88.2	102.7	87.8	85.0	87.5	77.4
1986	96.8	91.4	155.2	116.7	119.5	115.4	91.2
1987	94.0	98.7	170.8	136.9	153.7	136.3	102.6
1988	93.0	110.8	185.3	132.4	157.8	137.9	111.8
1989	95.8	121.5	173.4	122.9	147.7	138.9	106.4
1990	96.5	128.4	167.4	148.0	175.8	171.0	126.2
Hourly Compensation For Manufacturing Production Workers (in U.S. dollars)							
1981	\$10.84	\$9.22	\$6.18	\$8.02	\$10.53	\$7.39	\$7.20
1982	11.64	10.09	5.70	7.85	10.28	7.27	6.82
1983	12.10	10.85	6.13	7.74	10.23	7.59	6.39
1984	12.51	10.99	6.34	7.29	9.43	7.25	5.95
1985	12.96	10.80	6.43	7.52	9.56	7.32	6.19
1986	13.21	11.00	9.31	10.27	13.29	9.91	7.54
1987	13.40	11.96	10.83	12.42	16.91	12.14	8.97
1988	13.85	13.56	12.80	12.96	18.04	12.89	10.46
1989	14.28	14.86	12.63	12.60	17.51	13.26	10.43
1990	14.83	15.94	12.84	15.25	21.30	16.29	12.42

Source: U.S. Department of Labor, Bureau of Labor Statistics

(currency units per U.S. dollar, except for United Kingdom where values are U.S. dollars per U.K. pound)

	Canada	Japan	France	Germany	Italy	United Kingdom
1971	1.0099	347.79	5.5100	3.4830	618.34	2.4442
1972	.9907	303.13	5.0444	3.1886	583.70	2.5034
1973	1.0002	271.31	4.4535	2.6715	582.41	2.4525
1974	.9780	291.84	4.8107	2.5868	650.81	2.3403
1975	1.0175	296.78	4.2877	2.4614	653.10	2.2217
1976	.9863	296.45	4.7825	2.5185	833.58	1.8048
1977	1.0633	268.62	4.9161	2.3236	882.78	1.7449
1978	1.1405	210.39	4.5091	2.0097	849.13	1.9184
1979	1.1713	219.02	4.2567	1.8343	831.11	2.1224
1980	1.1693	226.63	4.2251	1.8175	856.21	2.3246
1981	1.1990	220.63	5.4397	2.2632	1138.58	2.0243
1982	1.2344	249.06	6.5794	2.4281	1354.00	1.7480
1983	1.2325	237.55	7.6204	2.5539	1519.32	1.5159
1984	1.2952	237.46	8.7356	2.8455	1756.11	1.3368
1985	1.3659	238.47	8.9800	2.9420	1908.88	1.2974
1986	1.3896	168.35	6.9257	2.1705	1491.16	1.4677
1987	1.3259	144.60	6.0122	1.7981	1297.03	1.6398
1988	1.2306	128.17	5.9595	1.7570	1302.39	1.7813
1989	1.1842	138.07	6.3802	1.8808	1372.28	1.6382
1990	1.1668	145.00	5.4467	1.6166	1198.27	1.7841
1991	1.1460	134.59	5.6468	1.6610	1241.28	1.7674

Source: U.S. Federal Reserve Board

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**AMT Industry Estimates of New Orders,
Cancellations, Shipments and Backlog**

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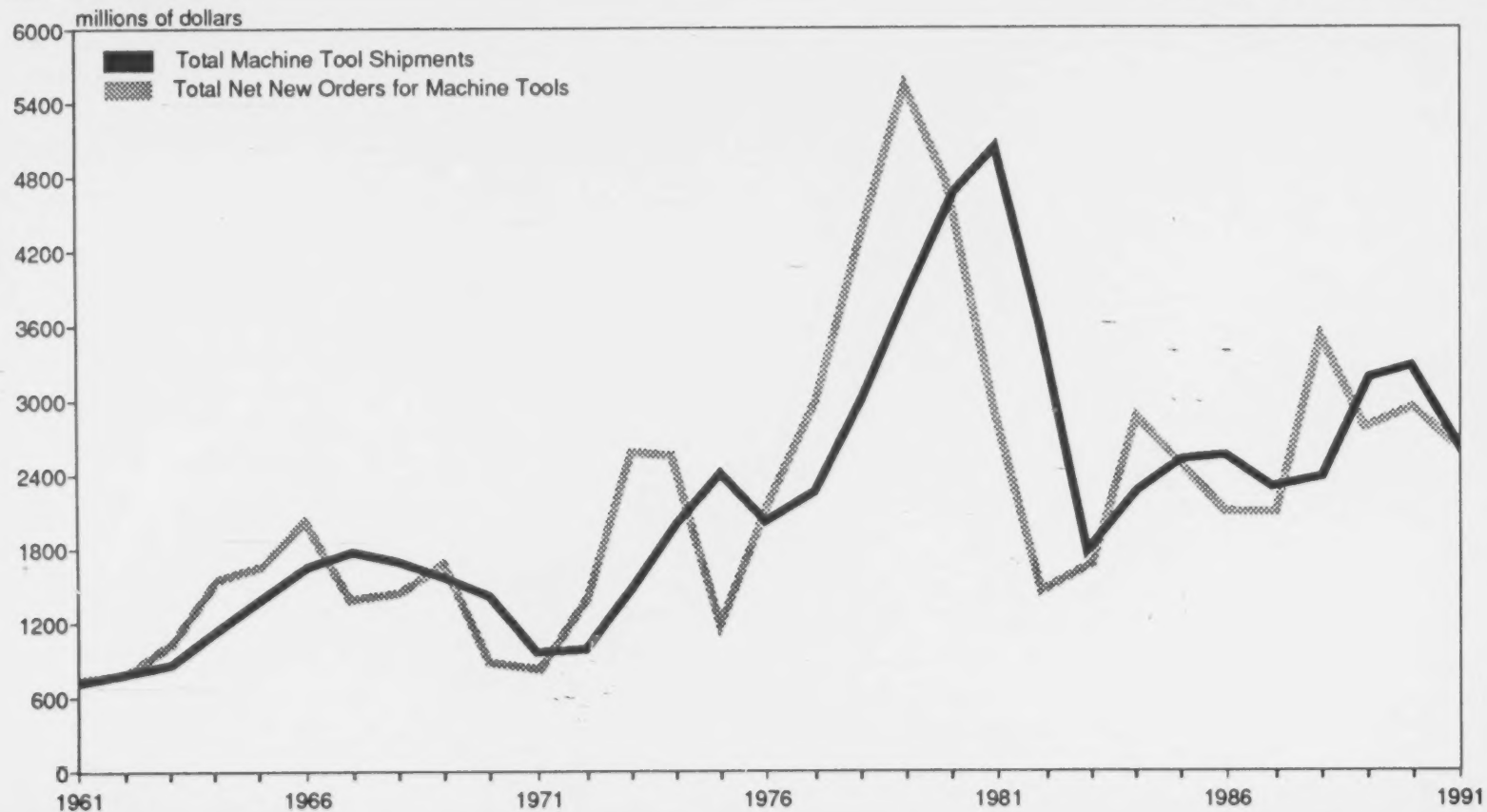
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U.S. MACHINE TOOLS

Shipments and Net New Orders



Source: AMT Industry Estimates

SHIPMENTS OF MACHINE TOOLS

1962 to 1991

(millions of dollars)

Year	TOTAL MACHINE TOOLS			METAL CUTTING			METAL FORMING		
	Total	Domestic	Foreign	Total	Domestic	Foreign	Total	Domestic	Foreign
1962	\$ 821	\$ 606	\$215	\$ 613	\$ 450	\$163	\$ 208	\$156	\$52
1963	896	741	155	639	526	113	257	215	42
1964	1,164	959	205	845	679	166	319	280	39
1965	1,426	1,249	177	1,023	886	137	403	363	40
1966	1,685	1,535	150	1,222	1,098	124	463	437	26
1967	1,806	1,618	188	1,353	1,211	142	453	407	46
1968	1,727	1,563	164	1,358	1,238	120	369	325	44
1969	1,597	1,446	151	1,192	1,077	115	405	369	36
1970	1,443	1,239	204	993	827	166	450	412	38
1971	998	840	158	672	554	118	326	286	40
1972	1,019	894	124	714	627	87	304	267	37
1973	1,501	1,323	178	1,074	935	139	427	388	39
1974	2,031	1,763	267	1,445	1,241	205	585	522	63
1975	2,452	2,033	419	1,879	1,548	331	573	484	89
1976	2,060	1,744	316	1,482	1,270	212	578	474	104
1977	2,281	2,030	251	1,651	1,470	181	630	560	70
1978	3,013	2,689	325	2,169	1,960	228	825	729	96
1979	3,877	3,465	411	2,930	2,605	325	947	860	87
1980	4,692	4,084	608	3,681	3,206	475	1,011	878	133
1981	5,096	4,377	719	4,105	3,553	552	991	824	167
1982	3,604	3,198	406	2,895	2,599	296	710	600	110
1983	1,845	1,630	215	1,372	1,200	172	474	430	43
1984	2,286	2,093	193	1,607	1,484	123	679	609	71
1985	2,545	2,291	254	1,742	1,549	194	803	743	60
1986	2,579	2,306	272	1,890	1,685	206	688	621	67
1987	2,324	2,037	287	1,677	1,499	178	647	538	109
1988	2,399	2,102	297	1,575	1,400	174	825	702	122
1989	3,195	2,763	432	2,359	2,059	299	837	704	133
1990	3,300	2,856	444	2,330	2,004	325	970	851	119
1991	2,673	2,220	454	1,872	1,595	276	802	625	177

3-1 Source: AMT Industry Estimates

Note: Totals may not add due to rounding

SHIPMENTS OF MACHINE TOOLS

Quarterly and Yearly, 1972-1976

(millions of dollars)

Quarter	TOTAL MACHINE TOOLS			METAL CUTTING			METAL FORMING		
	Total	Domestic	Foreign	Total	Domestic	Foreign	Total	Domestic	Foreign
1972-1 qtr.	\$ 215.30	\$ 183.75	\$ 31.55	\$ 142.75	\$ 121.90	\$ 20.85	\$ 72.55	\$ 61.85	\$ 10.70
2	260.60	229.55	31.05	176.75	155.65	21.10	83.85	73.90	9.95
3	236.35	209.30	27.05	172.50	151.30	21.20	63.85	58.00	5.85
4	306.45	271.75	34.70	222.45	198.30	24.15	84.00	73.45	10.55
Total	1,018.70	894.35	124.35	714.45	627.15	87.30	304.25	267.20	37.05
1973-1 qtr.	330.55	295.05	35.50	239.35	209.95	29.40	91.20	85.10	6.10
2	390.70	347.50	43.20	279.80	243.75	36.05	110.90	103.75	7.15
3	345.60	296.65	48.95	245.30	207.45	37.85	100.30	89.20	11.10
4	434.15	383.90	50.25	309.30	273.90	35.40	124.85	110.00	14.85
Total	1,501.00	1,323.10	177.90	1,073.75	935.05	138.70	427.25	388.05	39.20
1974-1 qtr.	433.30	378.55	54.75	309.25	269.85	39.40	124.05	108.70	15.35
2	525.60	464.25	61.35	368.65	323.80	44.85	156.95	140.45	16.50
3	478.15	408.80	69.35	345.70	291.00	54.70	132.45	117.80	14.65
4	593.50	511.55	81.95	422.25	356.70	65.55	171.25	154.85	16.40
Total	2,030.55	1,763.15	267.40	1,445.85	1,241.35	204.50	584.70	521.80	62.90
1975-1 qtr.	636.25	526.55	109.70	453.80	375.40	78.40	182.45	151.15	31.30
2	656.15	554.75	101.40	528.00	443.45	84.55	128.15	111.30	16.85
3	566.80	467.15	99.65	440.90	361.85	79.05	125.90	105.30	20.60
4	592.50	484.15	108.35	455.95	367.40	88.55	136.55	116.75	19.80
Total	2,451.70	2,032.60	419.10	1,878.65	1,548.10	330.55	573.05	484.50	88.55
1976-1 qtr.	531.85	446.55	85.30	392.65	334.15	58.50	139.20	112.40	26.80
2	517.85	425.40	92.45	367.85	302.10	65.75	150.00	123.30	26.70
3	460.35	393.45	66.90	329.95	284.85	45.10	130.40	108.60	21.80
4	549.60	477.95	71.65	391.65	348.75	42.90	157.95	129.20	28.75
Total	2,059.65	1,743.35	316.30	1,482.10	1,269.85	212.25	577.55	473.50	104.05

Source: AMT Industry Estimates

SHIPMENTS OF MACHINE TOOLS

Quarterly and Yearly, 1977-1981

(millions of dollars)

Quarter	TOTAL MACHINE TOOLS			METAL CUTTING			METAL FORMING		
	Total	Domestic	Foreign	Total	Domestic	Foreign	Total	Domestic	Foreign
1977-1 qtr.	\$ 496.90	\$ 433.80	\$ 63.10	\$ 336.10	\$ 297.55	\$ 38.55	\$160.80	\$ 136.25	\$ 24.55
2	584.70	526.30	58.40	410.80	365.65	45.15	173.90	160.65	13.25
3	524.05	476.00	48.05	395.15	359.30	35.85	128.90	116.70	12.20
4	675.10	594.10	81.00	508.75	447.35	61.40	166.35	146.75	19.60
Total	2,280.75	2,030.20	250.55	1,650.80	1,469.85	180.95	629.95	560.35	69.60
1978-1 qtr.	683.20	620.90	62.30	503.85	459.65	44.20	179.35	161.25	18.10
2	791.60	712.55	79.05	584.20	526.95	57.25	207.40	185.60	21.80
3	687.55	609.80	77.75	498.05	438.85	59.20	189.50	170.95	18.55
4	851.10	745.35	105.75	602.40	534.65	67.75	248.70	210.70	38.00
Total	3,013.45	2,688.60	324.85	2,188.50	1,960.10	228.40	824.95	728.50	96.45
1979-1 qtr.	858.05	769.75	88.30	633.45	564.45	69.00	224.60	205.30	19.30
2	978.20	869.05	109.15	735.75	648.10	87.65	242.45	220.95	21.50
3	899.85	802.80	97.05	689.85	611.35	78.50	210.00	191.45	18.55
4	1,140.45	1,023.70	116.75	871.00	781.60	89.40	269.45	242.10	27.35
Total	3,876.55	3,465.30	411.25	2,930.05	2,605.50	324.55	946.50	859.80	86.70
1980-1 qtr.	1,146.15	1,030.45	115.70	881.40	794.65	86.75	264.75	235.80	28.95
2	1,193.30	1,037.75	155.55	925.35	802.50	122.85	267.95	235.25	32.70
3	1,049.05	915.20	133.85	830.45	727.80	102.65	218.60	187.40	31.20
4	1,303.25	1,100.85	202.40	1,043.60	881.05	162.55	259.65	219.80	39.85
Total	4,691.75	4,084.25	607.50	3,680.80	3,206.00	474.80	1,010.95	878.25	132.70
1981-1 qtr.	1,288.20	1,077.40	210.80	1,017.85	862.25	155.60	270.35	215.15	55.20
2	1,367.50	1,131.15	236.35	1,103.40	917.95	185.45	264.10	213.20	50.90
3	1,133.95	1,006.00	127.95	920.30	820.35	99.95	213.65	185.65	28.00
4	1,305.95	1,162.10	143.85	1,062.95	951.90	111.05	243.00	210.20	32.80
Total	5,095.60	4,376.65	718.95	4,104.50	3,552.45	552.05	991.10	824.20	166.90

Source: AMT Industry Estimates

SHIPMENTS OF MACHINE TOOLS

Quarterly and Yearly, 1982-1986

(millions of dollars)

Quarter	TOTAL MACHINE TOOLS			METAL CUTTING			METAL FORMING		
	Total	Domestic	Foreign	Total	Domestic	Foreign	Total	Domestic	Foreign
1982-1 qtr.	\$1,154.20	\$1,041.55	\$112.65	\$933.05	\$861.30	\$71.75	\$221.15	\$180.25	\$40.90
2	1,008.45	911.85	96.60	810.65	735.30	75.35	197.80	176.55	21.25
3	783.40	676.20	107.20	640.45	550.70	89.75	142.95	125.50	17.45
4	658.35	568.75	89.60	510.60	451.30	59.30	147.75	117.45	30.30
Total	3,604.40	3,198.35	406.05	2,894.75	2,598.60	296.15	709.65	599.75	109.90
1983-1 qtr.	487.45	430.80	56.65	370.60	329.80	40.80	116.85	101.00	15.85
2	469.65	411.35	58.30	357.50	308.20	49.30	112.15	103.15	9.00
3	357.05	314.15	42.90	252.35	220.15	32.20	104.70	94.00	10.70
4	530.90	473.75	57.15	391.05	341.45	49.60	139.85	132.30	7.55
Total	1,845.05	1,630.05	215.00	1,371.50	1,199.60	171.90	473.55	430.45	43.10
1984-1 qtr.	449.50	408.95	40.55	298.10	273.00	25.10	151.40	135.95	15.45
2	572.30	521.60	50.70	401.80	373.55	28.25	170.50	148.05	22.45
3	568.85	527.00	41.85	401.55	377.25	24.30	167.30	149.75	17.55
4	695.20	635.05	60.15	505.05	460.05	45.00	190.15	175.00	15.15
Total	2,285.85	2,092.60	193.25	1,606.50	1,483.85	122.65	679.35	608.75	70.60
1985-1 qtr.	531.70	482.75	48.95	357.05	319.90	37.15	174.65	162.85	11.80
2	586.05	548.35	37.70	385.00	357.55	27.45	201.05	190.80	10.25
3	654.65	596.40	58.25	443.05	407.10	35.95	211.60	189.30	22.30
4	772.80	663.95	108.85	557.15	463.95	93.20	215.65	200.00	15.65
Total	2,545.20	2,291.45	253.75	1,742.25	1,548.50	193.75	802.95	742.95	60.00
1986-1 qtr.	597.30	529.80	67.50	386.95	331.75	55.20	210.35	198.05	12.30
2	751.00	686.90	64.10	569.35	519.85	49.50	181.65	167.05	14.60
3	549.35	485.15	64.20	418.70	369.20	49.50	130.65	115.95	14.70
4	680.85	604.20	76.65	515.30	463.90	51.40	165.55	140.30	25.25
Total	2,578.50	2,306.05	272.45	1,890.30	1,684.70	205.60	688.20	621.35	66.85

Source: AMT Industry Estimates

SHIPMENTS OF MACHINE TOOLS

Quarterly and Yearly, 1987-1992

(millions of dollars)

Quarter	TOTAL MACHINE TOOLS			METAL CUTTING			METAL FORMING		
	Total	Domestic	Foreign	Total	Domestic	Foreign	Total	Domestic	Foreign
1987-1 qtr.	\$ 476.80	\$ 420.85	\$ 55.95	\$ 349.15	\$ 311.10	\$ 38.05	\$ 127.65	\$ 109.75	\$ 17.90
2	614.10	542.80	71.30	442.60	396.30	46.30	171.50	146.50	25.00
3	556.65	490.35	66.30	397.75	354.40	43.35	158.90	135.95	22.95
4	676.10	582.75	93.35	487.00	437.05	49.95	189.10	145.70	43.40
Total	2,323.65	2,036.75	286.90	1,676.50	1,498.85	177.65	547.15	537.90	109.25
1988-1 qtr.	516.50	456.50	60.00	317.85	282.55	35.30	198.65	173.95	24.70
2	551.15	476.75	74.40	339.35	298.45	40.90	211.80	178.30	33.50
3	569.20	502.85	66.35	391.30	352.65	38.65	177.90	150.20	27.70
4	762.25	666.20	96.05	526.05	466.45	59.60	236.20	199.75	36.45
Total	2,399.10	2,102.30	296.80	1,574.55	1,400.10	174.45	824.55	702.20	122.35
1989-1 qtr.	687.65	606.25	81.40	481.55	430.65	50.90	206.10	175.60	30.50
2	817.85	716.70	101.15	578.15	513.70	64.45	239.70	203.00	36.70
3	745.50	636.15	109.35	574.00	491.40	82.60	171.50	144.75	26.75
4	944.60	804.25	140.35	724.90	623.45	101.45	219.70	180.80	38.90
Total	3,195.60	2,763.35	432.25	2,358.60	2,059.20	299.40	837.00	704.15	132.85
1990-1 qtr.	783.25	678.60	104.65	545.85	466.80	79.05	237.40	211.80	25.60
2	881.30	772.60	108.70	638.80	544.05	84.75	242.50	218.55	23.95
3	763.65	671.10	92.55	507.50	448.15	59.35	256.15	222.95	33.20
4	871.70	733.25	138.45	637.45	535.45	102.00	234.25	197.80	36.45
Total	3,299.90	2,855.50	444.35	2,329.60	2,004.45	325.15	970.30	851.10	119.20
1991-1 qtr.	661.55	557.30	104.25	417.80	351.45	66.35	243.75	205.85	37.90
2	651.05	526.90	124.15	461.80	388.10	73.70	189.25	138.80	50.45
3	612.85	501.90	110.95	453.55	400.10	53.45	159.30	101.80	57.50
4	748.00	872.15	114.15	538.65	455.70	82.95	209.35	178.15	31.20
Total	2,673.45	2,219.95	453.50	1,871.80	1,595.35	276.45	801.65	624.60	177.05
1992-1 qtr.	647.30	541.95	105.35	461.95	405.00	56.95	185.35	136.95	48.40

Source: AMT Industry Estimates

SHIPMENTS OF MACHINE TOOLS

Monthly, 1989-1990

(millions of dollars)

Month	TOTAL MACHINE TOOLS			METAL CUTTING			METAL FORMING		
	Total	Domestic	Foreign	Total	Domestic	Foreign	Total	Domestic	Foreign
1989									
January	\$152.20	\$131.70	\$20.50	\$102.85	\$89.50	\$13.35	\$49.35	\$42.20	\$ 7.15
February	228.80	200.30	28.50	151.25	133.90	17.35	77.55	66.40	11.15
March	306.65	274.25	32.40	227.45	207.25	20.20	79.20	67.00	12.20
April	249.55	227.15	22.40	184.05	168.35	15.70	65.50	58.80	6.70
May	240.75	219.50	21.25	158.40	145.40	13.00	82.35	74.10	8.25
June	327.55	270.05	57.50	235.70	199.95	35.75	91.85	70.10	21.75
July	237.70	206.00	31.70	175.60	155.45	20.15	62.10	50.55	11.55
August	225.80	196.95	28.85	169.90	147.20	22.70	55.90	49.75	6.15
September	282.00	233.20	48.80	228.50	188.75	39.75	53.50	44.45	9.05
October	251.55	220.75	30.80	183.55	161.95	21.60	68.00	58.80	9.20
November	313.70	265.25	48.45	228.60	201.10	27.50	85.10	64.15	20.95
December	379.35	318.25	61.10	312.75	260.40	52.35	66.60	57.85	8.75
1990									
January	226.35	199.05	27.30	162.20	143.40	18.80	64.15	55.65	8.50
February	268.00	233.30	34.70	169.50	143.60	25.90	98.50	89.70	8.80
March	288.90	246.25	42.65	214.15	179.80	34.35	74.75	66.45	8.30
April	258.10	218.35	39.75	168.95	141.65	27.30	89.15	76.70	12.45
May	272.60	242.95	29.65	193.80	171.95	21.85	78.80	71.00	7.80
June	350.25	310.95	39.30	275.70	240.10	35.60	74.55	70.85	3.70
July	233.40	211.35	22.05	161.80	144.00	17.80	71.60	67.35	4.25
August	231.35	197.15	34.20	155.75	135.85	19.90	75.60	61.30	14.30
September	298.90	262.60	36.30	189.95	168.30	21.65	108.95	94.30	14.65
October	253.75	222.10	31.65	188.80	164.90	23.90	64.95	57.20	7.75
November	267.45	224.00	43.45	182.20	160.60	21.60	85.25	63.40	21.85
December	350.50	287.15	63.35	266.45	209.95	56.50	84.05	77.20	6.85

Source: AMT Industry Estimates

SHIPMENTS OF MACHINE TOOLS

Monthly, 1991-1992

(millions of dollars)

Month	TOTAL MACHINE TOOLS			METAL CUTTING			METAL FORMING		
	Total	Domestic	Foreign	Total	Domestic	Foreign	Total	Domestic	Foreign
1991									
January	\$182.55	\$154.25	\$28.30	\$110.80	\$93.25	\$17.55	\$71.75	\$61.00	\$10.75
February	202.15	168.25	33.98	133.15	109.45	23.70	69.00	58.80	10.20
March	276.85	234.80	42.05	173.85	148.75	25.10	103.00	86.05	16.95
April	207.05	173.60	33.45	145.35	126.55	18.80	61.70	47.05	14.65
May	231.85	201.85	30.00	173.85	157.25	16.60	58.00	44.60	13.40
June	212.15	151.45	60.70	142.60	104.30	38.30	69.55	47.15	22.40
July	212.80	172.35	40.45	149.40	137.35	12.05	63.40	35.00	28.40
August	183.35	152.60	30.75	137.35	121.85	15.50	46.00	30.75	15.25
September	216.70	176.95	39.75	166.80	140.90	25.90	49.90	36.05	13.85
October	235.75	203.70	32.05	177.30	155.35	21.95	58.45	48.35	10.10
November	230.25	195.60	34.65	144.35	118.70	25.65	85.90	76.90	9.00
December	282.00	234.55	47.45	217.00	181.65	35.35	65.00	52.90	12.10
1992									
January	159.80	135.55	24.25	106.25	97.50	8.75	53.55	38.05	15.50
February	201.00	168.40	32.60	140.25	121.80	18.45	60.75	46.60	14.15
March	286.50	238.00	48.50	215.45	185.70	29.75	71.05	52.30	18.75
April	199.30	165.15	34.15	156.45	130.50	25.95	42.85	34.65	8.20

Source: AMT Industry Estimates

NET NEW ORDERS OF MACHINE TOOLS

1962 to 1991

(millions of dollars)

Year	TOTAL MACHINE TOOLS			METAL CUTTING			METAL FORMING		
	Total	Domestic	Foreign	Total	Domestic	Foreign	Total	Domestic	Foreign
1962	\$ 815	\$ 661	\$154	\$ 571	\$ 468	\$103	\$244	\$193	\$51
1963	1,061	869	192	760	607	153	301	262	39
1964	1,577	1,348	229	1,038	861	177	539	487	52
1965	1,692	1,532	160	1,251	1,122	129	441	410	31
1966	2,074	1,884	190	1,629	1,483	146	445	401	44
1967	1,420	1,272	148	1,134	1,024	110	286	248	38
1968	1,474	1,320	154	1,080	960	120	394	360	34
1969	1,728	1,517	211	1,195	1,033	162	533	484	49
1970	912	733	179	651	507	144	261	226	35
1971	861	747	114	609	524	85	252	223	29
1972	1,412	1,245	167	1,009	877	132	403	368	35
1973	2,613	2,268	345	1,825	1,550	275	787	717	70
1974	2,583	2,185	398	2,017	1,716	301	566	470	96
1975	1,277	1,064	213	916	781	135	361	284	77
1976	2,203	1,961	242	1,662	1,477	185	541	485	56
1977	2,995	2,709	286	2,202	1,981	221	793	729	64
1978	4,349	3,944	405	3,375	3,043	332	973	901	72
1979	5,621	4,856	765	4,495	3,866	629	1,126	991	135
1980	4,754	4,239	515	3,885	3,496	389	870	744	126
1981	2,945	2,563	382	2,228	1,946	282	717	617	100
1982	1,498	1,261	236	1,064	890	175	433	372	62
1983	1,696	1,558	138	1,152	1,069	82	545	489	56
1984	2,916	2,631	285	1,916	1,700	216	1,000	932	69
1985	2,528	2,262	266	1,853	1,652	201	675	610	65
1986	2,125	1,883	242	1,544	1,377	168	581	507	74
1987	2,119	1,831	288	1,451	1,294	157	667	536	131
1988	3,591	3,065	526	2,708	2,316	392	883	749	134
1989	2,808	2,442	366	1,977	1,723	254	832	719	113
1990	2,965	2,533	432	2,070	1,772	298	894	761	134
1991	2,642	2,096	547	1,894	1,549	345	748	546	202

Source: AMT Industry Estimates

NET NEW ORDERS OF MACHINE TOOLS

Quarterly and Yearly, 1972-1976

(millions of dollars)

Quarter	TOTAL MACHINE TOOLS			METAL CUTTING			METAL FORMING		
	Total	Domestic	Foreign	Total	Domestic	Foreign	Total	Domestic	Foreign
1972-1 qtr.	\$ 275.60	\$ 242.05	\$ 33.55	\$ 207.65	\$ 180.55	\$ 27.10	\$ 67.95	\$ 61.50	\$ 6.45
2	319.65	284.75	34.90	222.15	193.80	28.35	97.50	90.95	6.55
3	353.10	301.55	51.55	253.70	210.90	42.80	99.40	90.65	8.75
4	463.65	417.10	46.55	325.45	292.00	33.45	138.20	125.10	13.10
Total	1,412.00	1,245.45	166.55	1,008.95	877.25	131.70	403.05	368.20	34.85
1973-1 qtr.	632.00	558.15	73.85	426.00	370.15	55.85	206.00	188.00	18.00
2	678.10	610.55	67.55	448.00	395.45	52.55	230.10	215.10	15.00
3	600.10	512.85	87.25	427.35	358.45	68.90	172.75	154.40	18.35
4	702.45	586.05	116.40	524.10	426.35	97.75	178.35	159.70	18.65
Total	2,612.65	2,267.60	345.05	1,825.45	1,550.40	275.05	787.20	717.20	70.00
1974-1 qtr.	752.20	644.50	107.70	597.85	509.75	88.10	154.35	134.75	19.60
2	847.85	737.95	109.90	676.20	592.55	83.65	171.65	145.40	26.25
3	631.50	536.30	95.20	465.00	394.10	70.90	166.50	142.20	24.30
4	351.50	266.50	85.00	278.00	219.25	58.75	73.50	47.25	26.25
Total	2,583.05	2,185.25	397.80	2,017.05	1,715.65	301.40	566.00	469.60	96.40
1975-1 qtr.	237.60	188.35	49.25	176.25	147.70	28.55	61.35	40.65	20.70
2	345.75	276.80	68.95	240.85	201.05	39.80	104.90	75.75	29.15
3	340.45	293.75	46.70	241.35	209.60	31.75	99.10	84.15	14.95
4	352.95	305.15	47.80	257.45	222.15	35.30	95.50	83.00	12.50
Total	1,276.75	1,064.05	212.70	915.90	780.50	135.40	360.85	283.55	77.30
1976-1 qtr.	413.30	354.50	58.80	305.75	259.95	45.80	107.55	94.55	13.00
2	496.60	452.70	43.90	354.05	322.70	31.35	142.55	130.00	12.55
3	597.30	527.80	69.50	439.40	383.50	55.90	157.90	144.30	13.60
4	696.00	626.45	69.55	562.95	510.45	52.50	133.05	116.00	17.05
Total	2,203.20	1,961.45	241.75	1,662.15	1,476.60	185.55	541.05	484.85	56.20

Source: AMT Industry Estimates

NET NEW ORDERS OF MACHINE TOOLS

Quarterly and Yearly, 1977-1981

(millions of dollars)

Quarter	TOTAL MACHINE TOOLS			METAL CUTTING			METAL FORMING		
	Total	Domestic	Foreign	Total	Domestic	Foreign	Total	Domestic	Foreign
1977-1 qtr.	\$ 667.45	\$ 603.90	\$ 63.55	\$ 489.00	\$ 443.85	\$ 45.15	\$178.45	\$ 160.05	\$ 18.40
2	770.55	692.25	78.30	583.70	522.60	61.10	186.85	169.65	17.20
3	725.85	650.70	75.15	496.20	435.30	60.90	229.65	215.40	14.25
4	831.50	762.80	68.70	633.15	578.95	54.20	198.35	183.85	14.50
Total	2,995.35	2,709.65	285.70	2,202.05	1,980.70	221.35	793.30	728.95	64.35
1978-1 qtr.	940.05	847.30	92.75	723.85	646.25	77.60	216.20	201.05	15.15
2	1,129.95	1,013.25	116.70	886.55	789.55	97.00	243.40	223.70	19.70
3	1,027.65	953.85	73.80	776.95	720.70	56.25	250.70	233.15	17.55
4	1,250.85	1,129.70	121.15	988.10	886.65	101.45	262.75	243.05	19.70
Total	4,348.50	3,944.10	404.40	3,375.45	3,043.15	332.30	973.05	900.95	72.10
1979-1 qtr.	1,471.40	1,322.80	148.60	1,158.25	1,031.55	126.70	313.15	291.25	21.90
2	1,356.45	1,189.00	167.45	1,083.55	963.30	120.25	272.90	225.70	47.20
3	1,353.20	1,171.85	181.35	1,120.50	969.40	151.10	232.70	202.45	30.25
4	1,440.40	1,172.85	267.55	1,132.80	901.55	231.25	307.60	271.30	36.30
Total	5,621.45	4,856.50	764.95	4,495.10	3,865.80	629.30	1,126.35	990.70	135.65
1980-1 qtr.	1,517.45	1,331.95	185.50	1,207.80	1,057.90	149.90	309.65	274.05	35.60
2	1,335.35	1,210.05	125.30	1,142.10	1,054.30	87.80	193.25	155.75	37.50
3	917.50	825.35	92.15	728.30	659.05	69.25	189.20	166.30	22.90
4	984.00	872.20	111.80	806.55	724.25	82.30	177.45	147.95	29.50
Total	4,754.30	4,239.55	514.75	3,884.75	3,495.50	389.25	869.55	744.05	125.50
1981-1 qtr.	920.35	809.95	110.40	706.60	615.25	91.35	213.75	194.70	19.05
2	867.00	723.60	143.40	661.20	559.95	101.25	205.80	163.65	42.15
3	593.45	530.65	62.80	455.25	408.10	47.15	138.20	122.55	15.65
4	564.05	498.45	65.60	405.05	362.50	42.55	159.00	135.95	23.05
Total	2,944.85	2,562.65	382.20	2,228.10	1,945.80	282.30	716.75	616.85	99.90

Source: AMT Industry Estimates

NET NEW ORDERS FOR MACHINE TOOLS

Quarterly and Yearly, 1982-1986

(millions of dollars)

Quarter	TOTAL MACHINE TOOLS			METAL CUTTING			METAL FORMING		
	Total	Domestic	Foreign	Total	Domestic	Foreign	Total	Domestic	Foreign
1982-1 qtr.	\$ 506.80	\$ 432.30	\$ 74.50	\$ 384.85	\$ 328.40	\$ 56.45	\$ 121.95	\$ 103.90	\$ 18.05
2	382.65	303.05	79.60	274.75	216.45	58.30	107.90	86.60	21.30
3	279.95	237.30	42.65	183.45	154.00	29.45	96.50	83.30	13.20
4	328.35	288.70	39.65	221.40	190.75	30.65	106.95	97.95	9.00
Total	1,497.75	1,261.35	236.40	1,064.45	889.60	174.85	433.30	371.75	61.55
1983-1 qtr.	314.85	285.55	29.30	224.10	205.85	18.25	90.75	79.70	11.05
2	399.10	366.70	32.40	269.30	250.30	19.00	129.80	116.40	13.40
3	468.15	439.45	28.70	322.20	305.90	16.30	145.95	133.55	12.40
4	514.05	466.50	47.55	336.05	307.40	28.65	178.00	159.10	18.90
Total	1,696.15	1,558.20	137.95	1,151.65	1,069.45	82.20	544.50	488.75	55.75
1984-1 qtr.	600.45	551.90	48.55	412.75	376.10	36.65	187.70	175.80	11.90
2	764.40	654.65	109.75	499.20	410.75	88.45	265.20	243.90	21.30
3	800.20	734.95	65.25	493.00	439.15	53.85	307.20	295.80	11.40
4	750.75	689.55	61.20	510.85	473.55	37.30	239.90	216.00	23.90
Total	2,915.80	2,631.05	284.75	1,915.80	1,699.55	216.25	1,000.00	931.50	68.50
1985-1 qtr.	728.25	663.25	65.00	528.50	475.50	53.00	199.65	187.65	12.00
2	641.40	582.45	58.95	475.70	430.15	45.55	165.70	152.30	13.40
3	558.45	465.35	93.10	404.75	338.80	65.95	153.70	126.55	27.15
4	600.00	551.10	48.90	444.15	407.70	36.45	155.85	143.40	12.45
Total	2,528.10	2,262.15	265.95	1,853.10	1,652.15	200.95	675.00	610.00	65.00
1986-1 qtr.	615.75	570.00	45.75	463.50	431.45	32.05	152.25	138.55	13.70
2	600.60	536.80	63.80	434.65	382.45	52.20	165.95	154.35	11.60
3	459.65	387.90	71.75	344.05	297.80	46.25	115.60	90.10	25.50
4	449.30	388.65	60.65	302.05	264.85	37.20	147.25	123.80	23.45
Total	2,125.30	1,883.35	241.95	1,544.25	1,376.55	167.70	581.05	506.80	74.25

Source: AMT Industry Estimates

NET NEW ORDERS OF MACHINE TOOLS

(millions of dollars)

Quarterly and Yearly, 1987-1992

Quarter	TOTAL MACHINE TOOLS			METAL CUTTING			METAL FORMING		
	Total	Domestic	Foreign	Total	Domestic	Foreign	Total	Domestic	Foreign
1987-1 qtr.	\$ 463.70	\$ 396.25	\$ 67.45	\$ 326.10	\$ 291.55	\$ 34.55	\$ 137.60	\$ 104.70	\$ 32.90
2	521.15	463.55	57.60	339.30	303.60	35.70	181.85	159.95	21.90
3	487.85	412.45	75.40	324.55	291.60	32.95	163.30	120.85	42.45
4	646.10	558.25	87.85	461.50	407.70	53.80	184.60	150.55	34.05
Total	2,118.80	1,830.50	288.30	1,451.45	1,294.45	157.00	667.35	536.05	131.30
1988-1 qtr.	850.00	746.95	103.05	666.25	597.85	68.40	183.75	149.10	34.65
2	960.50	817.60	142.90	676.50	562.75	113.75	284.00	254.85	29.15
3	922.65	778.75	143.90	715.00	599.80	115.20	207.65	178.95	28.70
4	857.70	721.80	135.90	650.15	555.35	94.80	207.55	166.45	41.10
Total	3,590.85	3,065.10	525.75	2,707.90	2,315.75	392.15	882.95	749.35	133.60
1989-1 qtr.	803.30	708.75	94.55	602.55	536.90	65.65	200.75	171.85	28.90
2	688.50	598.75	89.75	459.55	399.65	59.90	228.95	199.10	29.85
3	720.45	626.00	94.45	481.90	407.20	74.70	238.55	218.80	19.75
4	595.70	508.35	87.35	432.35	379.05	53.30	163.35	129.30	34.05
Total	2,807.95	2,441.85	366.10	1,976.35	1,722.80	253.55	831.60	719.05	112.55
1990-1 qtr.	661.70	505.90	155.80	455.65	350.75	104.90	206.05	155.15	50.90
2	760.95	667.10	93.85	533.05	455.45	77.60	227.90	211.65	16.25
3	775.40	710.75	64.65	584.45	535.50	48.95	190.95	175.25	15.70
4	766.65	648.75	117.90	497.15	430.25	66.90	269.50	218.50	51.00
Total	2,964.70	2,532.50	432.20	2,070.30	1,771.95	298.35	894.40	760.55	133.85
1991-1 qtr	650.45	490.75	159.70	469.85	348.20	121.65	180.60	142.55	38.05
2	519.60	391.50	128.10	377.00	294.10	82.90	142.60	97.40	45.20
3	673.80	561.05	112.75	446.05	390.80	55.25	227.75	170.25	57.50
4	798.25	652.25	146.00	601.05	516.10	84.95	197.20	136.15	61.05
Total	2,642.10	2,095.55	546.55	1,893.95	1,549.20	344.75	748.15	546.35	201.80
1992-1 qtr	676.45	601.10	75.55	501.55	457.25	44.30	174.90	143.85	31.05

Source: AMT Industry Estimates

NET NEW ORDERS OF MACHINE TOOLS

(millions of dollars)

Monthly, 1987-1988

Month	TOTAL MACHINE TOOLS			METAL CUTTING			METAL FORMING		
	Total	Domestic	Foreign	Total	Domestic	Foreign	Total	Domestic	Foreign
1987									
January	\$146.65	\$118.55	\$28.10	\$ 98.95	\$ 85.65	\$13.30	\$47.70	\$ 32.90	\$14.80
February	152.85	141.45	11.40	103.70	98.35	5.35	49.15	43.10	6.05
March	164.20	136.25	27.95	123.45	107.55	15.90	40.75	28.70	12.05
April	130.30	110.15	20.15	79.55	65.15	14.40	50.75	45.00	5.75
May	188.10	176.10	12.00	144.80	139.60	5.20	43.30	36.50	6.80
June	202.75	177.30	25.45	114.95	98.85	16.10	87.80	78.45	9.35
July	163.00	128.50	34.50	102.10	84.60	17.50	60.90	43.90	17.00
August	142.00	126.85	15.15	96.35	90.25	6.10	45.65	36.60	9.05
September	182.85	157.10	25.75	126.10	116.75	9.35	56.75	40.35	16.40
October	267.40	246.70	20.70	198.15	187.15	11.00	69.25	59.55	9.70
November	137.30	102.10	35.20	89.10	65.75	23.35	48.20	36.35	11.85
December	241.40	209.45	31.95	174.25	154.80	19.45	67.15	54.65	12.50
1988									
January	297.50	266.05	31.45	223.95	205.75	18.20	73.55	60.30	13.25
February	298.05	258.85	39.20	250.40	217.95	32.45	47.65	40.90	6.75
March	254.45	222.05	32.40	191.90	174.15	17.75	62.55	47.90	14.65
April	253.00	193.45	59.55	195.30	146.45	48.85	57.70	47.00	10.70
May	324.70	278.90	45.80	242.85	205.65	37.20	81.85	73.25	8.60
June	382.80	345.25	37.55	238.35	210.65	27.70	144.45	134.60	9.85
July	254.95	221.35	33.60	187.00	167.55	19.45	67.95	53.80	14.15
August	339.50	252.80	86.70	261.50	179.30	82.20	78.00	73.50	4.50
September	328.20	304.60	23.60	266.50	252.95	13.55	61.70	51.65	10.05
October	262.25	239.25	23.00	215.40	199.25	16.15	46.85	40.00	6.85
November	279.00	230.85	48.15	188.35	164.60	23.75	90.65	66.25	24.40
December	316.45	251.70	64.75	246.40	191.50	54.90	70.05	60.20	9.85

Source: AMT Industry Estimates

NET NEW ORDERS OF MACHINE TOOLS

Monthly, 1989-1990

(millions of dollars)

Month	TOTAL MACHINE TOOLS			METAL CUTTING			METAL FORMING		
	Total	Domestic	Foreign	Total	Domestic	Foreign	Total	Domestic	Foreign
1989									
January	\$230.85	\$202.00	\$28.85	\$167.00	\$145.40	\$21.60	\$63.85	\$56.60	\$7.25
February	281.95	248.35	33.60	214.95	191.30	23.65	67.00	57.05	9.95
March	290.50	258.40	32.10	220.60	200.20	20.40	69.90	58.20	11.70
April	242.55	214.90	27.65	152.80	138.50	14.30	89.75	76.40	13.35
May	205.25	187.95	17.30	147.90	138.10	9.80	57.35	49.85	7.50
June	240.70	195.90	44.80	158.85	123.05	35.80	81.85	72.85	9.00
July	190.75	155.35	35.40	133.20	112.00	21.20	57.55	43.35	14.20
August	227.10	191.15	35.95	156.25	120.70	35.55	70.85	70.45	0.40
September	302.60	279.50	23.10	192.45	174.50	17.95	110.15	105.00	5.15
October	205.00	182.75	22.25	144.90	135.70	9.20	60.10	47.05	13.05
November	184.40	148.20	36.20	128.90	108.15	20.75	55.50	40.05	15.45
December	206.30	177.40	28.90	158.55	135.20	23.35	47.75	42.20	5.55
1990									
January	201.30	159.20	42.10	141.15	117.70	23.45	60.15	41.50	18.65
February	194.55	157.15	37.40	116.30	100.45	15.85	78.25	56.70	21.55
March	265.85	189.55	76.30	198.20	132.60	65.60	67.65	56.95	10.75
April	289.25	264.70	24.55	206.65	187.45	19.20	82.60	77.25	5.35
May	206.45	181.30	25.15	137.80	116.80	21.00	68.65	64.50	4.15
June	262.25	221.10	44.15	188.60	151.20	37.40	76.65	69.90	6.75
July	234.25	213.95	20.30	146.75	132.55	14.20	87.50	81.40	6.10
August	276.80	260.15	16.65	225.55	212.20	16.35	48.25	47.95	.30
September	264.35	236.65	27.70	209.15	190.70	18.40	55.20	45.90	9.30
October	268.10	234.15	33.95	182.40	166.05	16.35	85.70	68.10	17.60
November	202.75	161.25	41.50	136.65	113.10	23.55	66.10	48.15	17.95
December	295.80	253.35	42.45	178.10	151.10	27.00	117.70	102.25	15.45

Source: AMT Industry Estimates

NET NEW ORDERS OF MACHINE TOOLS

Monthly, 1991-1992

(millions of dollars)

Month	TOTAL MACHINE TOOLS			METAL CUTTING			METAL FORMING		
	Total	Domestic	Foreign	Total	Domestic	Foreign	Total	Domestic	Foreign
1991									
January	\$199.85	\$167.00	\$32.85	\$130.05	\$107.20	\$22.85	\$69.80	\$59.80	\$10.00
February	245.15	165.10	80.05	186.25	113.80	72.45	58.90	51.30	7.60
March	205.45	158.65	46.80	153.55	127.20	26.35	51.90	31.45	20.45
April	193.70	147.25	46.45	136.45	109.95	26.50	57.25	37.30	19.95
May	153.00	131.50	21.50	109.60	96.45	13.15	43.40	35.05	8.35
June	172.90	112.75	60.15	130.95	87.70	43.25	41.95	25.05	16.90
July	193.25	150.15	43.10	145.60	123.25	22.35	47.65	26.90	20.75
August	235.75	204.35	31.40	126.40	117.30	9.10	109.35	87.05	22.30
September	244.80	206.55	38.25	174.05	150.25	23.80	70.75	56.30	14.45
October	224.65	185.25	39.40	155.85	133.90	21.95	68.80	51.35	17.45
November	230.70	182.20	48.50	161.55	140.85	20.70	69.15	41.35	27.80
December	342.90	284.80	58.10	283.65	241.35	42.30	59.25	43.45	15.80
1992									
January	217.40	204.25	13.15	158.55	153.40	5.15	58.85	50.85	8.00
February	216.25	186.00	30.25	159.60	140.65	18.95	56.65	45.35	11.30
March	242.80	210.85	31.95	183.40	163.20	20.20	59.40	47.65	11.75
April	219.50	190.30	29.20	158.00	134.25	23.75	61.50	56.05	5.45

Source: AMT Industry Estimates

GROSS NEW ORDERS, CANCELLATIONS, AND NET NEW ORDERS OF MACHINE TOOLS

Metal Cutting and Metal Forming

(millions of dollars)

Year	TOTAL MACHINE TOOLS			METAL CUTTING			METAL FORMING		
	Gross New Orders	Cancellations	Net New Orders	Gross New Orders	Cancellations	Net New Orders	Gross New Orders	Cancellations	Net New Orders
1972	\$1,465	\$ 53	\$1,412	\$1,051	\$ 42	\$1,009	\$ 414	\$11	\$ 403
1973	2,773	160	2,613	1,958	132	1,825	815	28	787
1974	2,970	387	2,583	2,283	266	2,017	687	121	566
1975	1,651	374	1,277	1,198	282	916	453	92	361
1976	2,370	167	2,203	1,793	131	1,662	578	37	541
1977	3,153	158	2,995	2,329	127	2,202	824	31	793
1978	4,573	224	4,349	3,559	184	3,375	1,013	40	973
1979	6,063	442	5,621	4,873	378	4,495	1,190	64	1,126
1980	5,381	627	4,754	4,436	551	3,885	946	76	870
1981	3,585	640	2,945	2,799	571	2,228	786	69	717
1982	1,934	437	1,498	1,467	402	1,064	468	34	433
1983	1,890	194	1,696	1,328	177	1,152	561	17	545
1984	3,044	128	2,916	2,005	90	1,916	1,038	38	1,000
1985	2,716	188	2,528	1,983	130	1,853	733	58	675
1986	2,322	197	2,125	1,675	131	1,544	647	66	581
1987	2,253	134	2,119	1,533	82	1,451	719	52	667
1988	3,722	131	3,591	2,795	87	2,708	927	44	883
1989	2,987	179	2,808	2,119	143	1,976	867	36	832
1990	3,101	136	2,965	2,186	115	2,070	915	21	894
1991	2,773	131	2,642	2,009	115	1,894	765	17	748

Source: AMT Industry Estimates

GROSS NEW ORDERS, CANCELLATIONS, AND NET NEW ORDERS OF MACHINE TOOLS

Metal Cutting

(millions of dollars)

Year	METAL CUTTING			DOMESTIC			FOREIGN		
	Gross New Orders	Cancellations	Net New Orders	Gross New Orders	Cancellations	Net New Orders	Gross New Orders	Cancellations	Net New Orders
1970	\$ 757	\$ 106	\$ 651	\$ 605	\$ 99	\$ 506	\$ 152	\$ 7	\$ 145
1971	655	46	609	565	41	524	90	5	85
1972	1,051	42	1,009	916	39	877	135	3	132
1973	1,953	132	1,825	1,675	124	1,550	283	8	275
1974	2,283	266	2,017	1,959	243	1,716	324	23	301
1975	1,198	282	916	1,027	247	780	171	35	136
1976	1,793	131	1,662	1,594	117	1,477	199	14	185
1977	2,329	127	2,202	2,095	114	1,981	234	13	221
1978	3,559	184	3,375	3,203	160	3,043	356	24	332
1979	4,873	378	4,495	4,202	337	3,866	671	42	629
1980	4,436	551	3,885	3,986	490	3,496	450	61	389
1981	2,799	571	2,228	2,476	530	1,946	323	41	282
1982	1,467	402	1,064	1,262	373	890	204	30	175
1983	1,328	177	1,152	1,236	167	1,069	92	10	82
1984	2,005	90	1,916	1,780	80	1,700	226	9	216
1985	1,983	130	1,853	1,769	117	1,652	213	13	201
1986	1,675	131	1,544	1,499	122	1,377	176	9	168
1987	1,533	82	1,451	1,366	71	1,294	167	10	157
1988	2,795	87	2,708	2,392	76	2,316	403	11	392
1989	2,119	143	1,976	1,838	115	1,723	282	28	254
1990	2,186	115	2,070	1,867	95	1,772	318	20	298
1991	2,009	115	1,894	1,643	93	1,550	366	21	345

Source: AMT Industry Estimates

UNFILLED ORDERS OF MACHINE TOOLS

1970 to 1991

(millions of dollars)

Year (as of Dec. 31)	Total	Metal Cutting	Metal Forming
1970	\$ 706	\$ 471	\$ 228
1971	569	408	162
1972	963	702	621
1973	2,074	1,454	621
1974	2,625	2,025	600
1975	1,450	1,062	388
1976	1,594	1,243	351
1977	2,308	1,795	515
1978	3,643	2,981	663
1979	5,388	4,546	843
1980	5,451	4,750	701
1981	3,300	2,873	427
1982	1,194	1,043	151
1983	1,045	823	222
1984	1,675	1,132	542
1985	1,658	1,243	414
1986	1,204	897	307
1987	1,000	672	327
1988	2,191	1,806	386
1989	1,804	1,423	380
1990	1,468	1,164	304
1991	1,437	1,186	251

Source: AMT Industry Estimates

GLOSSARY

MACHINE TOOLS AND THE U.S. MACHINE TOOL INDUSTRY

A **machine tool** is a power-driven machine, not hand-held, that is used to cut, form or shape metal. Machine tools are typically installed as capital equipment in metalworking industries. Few if any products or services of an industrialized country would exist were it not for machine tools.

Production of automobiles, airplanes, home appliances, power plants, agricultural machinery, and most other products would be impossible without machine tools. Yet, because of their efficiency and longevity, machine tools themselves represent just a small part of the nation's output. If the entire U.S. machine tool industry was ranked by its 1990 shipments, it would be listed no higher than 143rd on the Fortune 500 of top companies by sales.

The industry is classified into two major industry subgroupings: Standard industrial classification code 3541, **metal cutting machines**; and 3542, **metal forming machines**. The major types of machines:

METAL CUTTING MACHINES

Boring Machines: used to enlarge, shape and/or finish a hole such as that made by a drilling machine (see below). Boring machines use a rotating cutting tool to cut a stationary workpiece.

Broaching Machines: using a long, toothed cutter to progressively form and finish a hole, slot, groove or contour in a single pass, as the cutter (or broach) is pulled or pushed in a straight line relative to the workpiece.

Drilling Machines: designed to make a hole in a workpiece by advancing a rotating tool, called a drill bit, into the stationary workpiece.

Electrical Discharge Machines (EDM): designed to remove metal by means of electrical discharge spark erosion.

Gear Cutting Machines: a specially designed milling machine used to form gear teeth on a cylindrically shaped gear blank.

Grinding Machines: used to remove materials from the workpiece with a grinding wheel.

Lathes: designed to remove metal by moving a cutting tool against a rotating workpiece. The axis of workpiece rotation may be either parallel to the floor as in a horizontal lathe, or perpendicular to the floor as in a vertical lathe.

Turning Center: a numerically controlled lathe with the capability to hold a number of tools. Some turning centers can perform limited milling, drilling, and boring operations.

Machining Centers: multi-function machines, typically combining boring-drilling-milling tasks. Machining centers have three or more axes of motion, have a contouring type numerical control and an automatic tool changer.

Milling Machines: designed to remove material using a rotating cutter which is also moved laterally with respect to the workpiece.

Station-Type Machines: provide several work processing locations (stations) in a single machine. The processes provided may include drilling, boring, milling, and finishing. Material handling capabilities are built-in to transport the workpiece from one work station to another. A transfer line is a type of station machine.

Tapping and Threading Machines: cut a "thread" into a hole by shaping its sides so that a matching piece (e.g., a screw) will fit. A tapping machine is similar to a drilling machine and many drilling machines have tapping capabilities. Threading machines are designed to take a turned workpiece and cut grooves into its sides (thus threading it in such a manner that it could fit into a tapped piece). A threading machine is similar to a lathe and most lathes have threading capabilities.

METAL FORMING MACHINES

Forging Machines: used to deform the workpiece into the desired shape by means of a single or repeated blows.

Die-Forming Machines: metal forming machines employing a pair of mating dies which, when forced against the interposed sheet of material, impart their contour on the otherwise flat sheet.

Bending Machines: designed to strain (bend) material which is usually in the form of bars or tubes.

Presses: machines having a stationary bed and a slide (ram) which has a controlled reciprocating motion toward and away from the bed surface and perpendicular to it. They are used to form and/or shear the workpiece (usually from flat sheet).

Shearing Machines: designed for straight-line cutting, involving the action of two opposing blades, one or both of which move during the shearing operation.

Punch Presses: cuts holes in stock. In general, any machine used to produce die-cut holes, regardless of shape.

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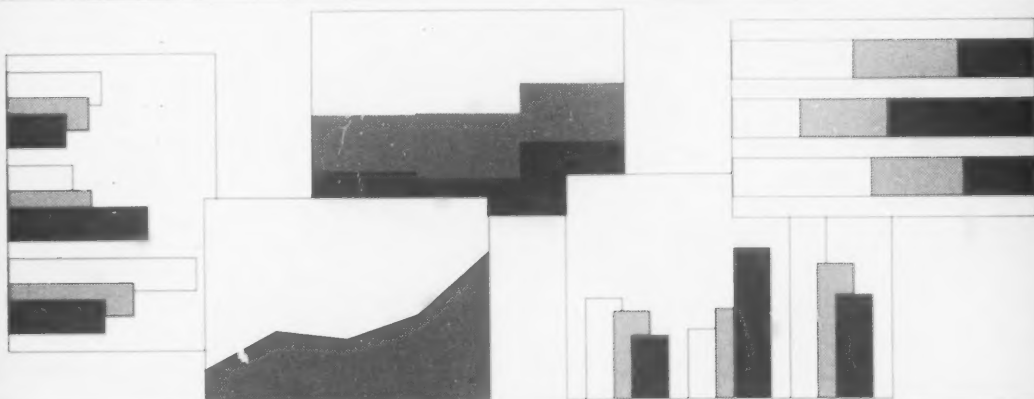
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The Economic Handbook of The Machine Tool Industry



GROSS NEW ORDERS, CANCELLATIONS, AND NET NEW ORDERS OF MACHINE TOOLS

Metal Forming

(millions of dollars)

Year	METAL FORMING			DOMESTIC			FOREIGN		
	Gross New Orders	Cancellations	Net New Orders	Gross New Orders	Cancellations	Net New Orders	Gross New Orders	Cancellations	Net New Orders
1970	\$ 303	\$ 42	\$ 261	\$ 265	\$ 38	\$ 227	\$ 38	\$ 4	\$ 34
1971	278	25	252	244	21	223	34	4	29
1972	414	11	403	378	10	368	36	1	35
1973	815	28	787	742	25	717	73	3	70
1974	687	121	566	583	113	470	105	8	96
1975	453	92	361	364	81	284	89	12	77
1976	578	37	541	513	28	485	64	8	56
1977	824	31	793	757	29	729	67	2	64
1978	1,013	40	973	938	37	901	75	3	72
1979	1,190	64	1,126	1,048	57	991	142	7	136
1980	946	76	870	814	70	744	132	6	126
1981	786	69	717	680	63	617	106	6	100
1982	468	34	433	399	28	372	68	7	62
1983	561	17	545	503	14	489	58	2	56
1984	1,038	38	1,000	967	36	932	71	3	69
1985	733	58	675	664	54	610	69	4	65
1986	647	66	581	567	60	507	81	7	74
1987	719	52	667	583	47	536	136	5	131
1988	927	44	883	788	39	749	138	5	134
1989	867	36	832	744	25	719	124	11	113
1990	915	21	894	774	13	761	141	8	134
1991	765	17	748	559	12	547	206	4	202

Source: AMT Industry Estimates